

POCKET COMPANION

CONTAINING

USEFUL INFORMATION & TABLES

PERTAINING TO
THE USE OF

STEEL

MANUFACTURED BY

DORMAN, LONG & Co.
LIMITED

MIDDLESBROUGH, ENGLAND.

COMPUTED AND EDITED BY
THE CONSTRUCTIONAL DEPARTMENT.

FOR THE USE OF ENGINEERS, ARCHITECTS
AND BUILDERS.

1906

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DORMAN, LONG & CO. LIMITED.

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WESTERN UNION TELEGRAPHIC CODE.

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A.I. TELEGRAPHIC CODE.

BRITISH STANDARD SECTION CODE.

Britannia Steel Works and Rolling Mills, Middlesbrough.

Telegraphic Address: "DORMAN, MIDDLESBROUGH."

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DORMAN, LONG & CO. LIMITED.

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WORKS AND STOCKYARDS**

AT THE FOLLOWING PLACES.

LONDON. Office : 19 Victoria Street, S.W.

Telegrams " PLEHISM, LONDON "

Stockyard and Shops. Nine Elms Lane, S.W.

Sheet Dep. | Office. 23 Leadenhall Street, E.C.

Wire Dept. | Telegrams " RHEILUR, LONDON "

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P.O. Box 4642. Telegrams " JOISTS, JOHANNESBURG "

PROPERTIES OF THE COMPANY.

BRITANNIA STEEL WORKS BRITANNIA ROLLING MILLS

•Basic Open Hearth Steel. Rolled Sections of all descriptions for Engineering, Shipbuilding, General Constructional Work and Allied Trades.

PAGES 1 TO 32

CONSTRUCTIONAL & BRIDGE SHOPS

Steel Frame Buildings, Workshops, Bridges, etc. etc.

PAGES 33 TO 149

SHEET DEPARTMENT

Rolling Mills with Galvanizing and Corrugating Shops. Steel and Iron Sheets, Corrugated, Curved and Plain. Requisite fittings of all descriptions.

PAGES 151 TO 163

WIRE & ROD DEPARTMENT

Rolling Mills, Wire-drawing and Galvanizing Shops.

PAGES 165 TO 173

CLARENCE STEEL WORKS CLARENCE ROLLING MILLS

Open Hearth Steel. Rolled Sections, Rails, Billets, Blooms, Tin Bars, Slabs and Flats.

Rails to Standard Sections and Specification

Conductivity Steel, and General Post Office,

India Office and British Railway Tests.

A Speciality. Steel up to 0.5% Carbon, for Wire Ropes, Springs, Picks, Saws, etc.

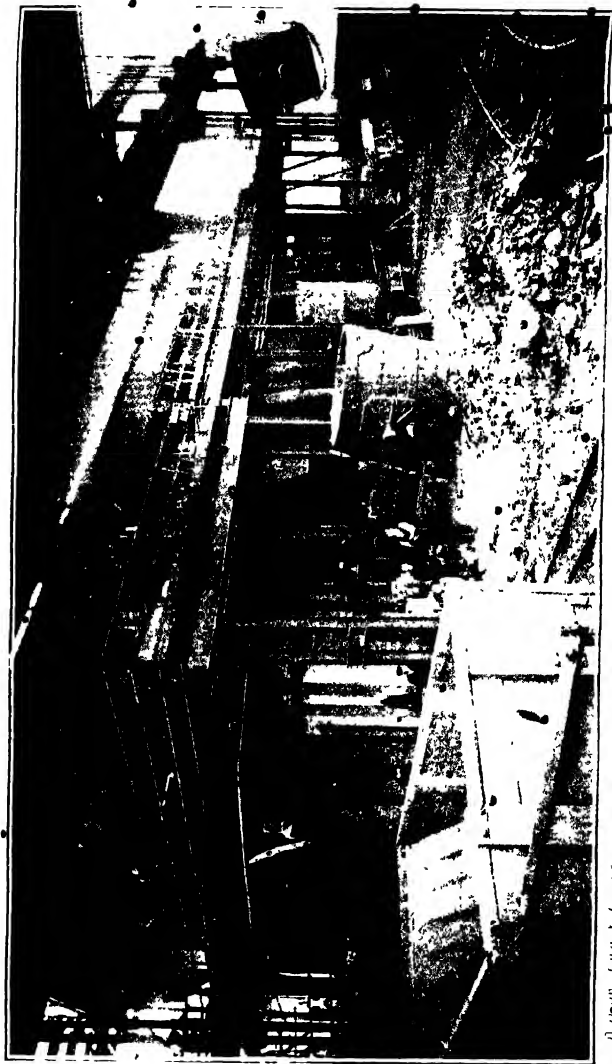
Cropped Blooms up to 25 cwt. each can be supplied.

PAGES 175 TO 178

GENERAL INFORMATION, FORMULÆ,
TABLES, ETC. ETC.

PAGES 179 TO 252





Design, Ltd & Co. Ltd

Walsby & Co. Ltd

BRIANNIA STEEL FURNACES. 300 TON MIXER-FOR MOLTEM IRON.

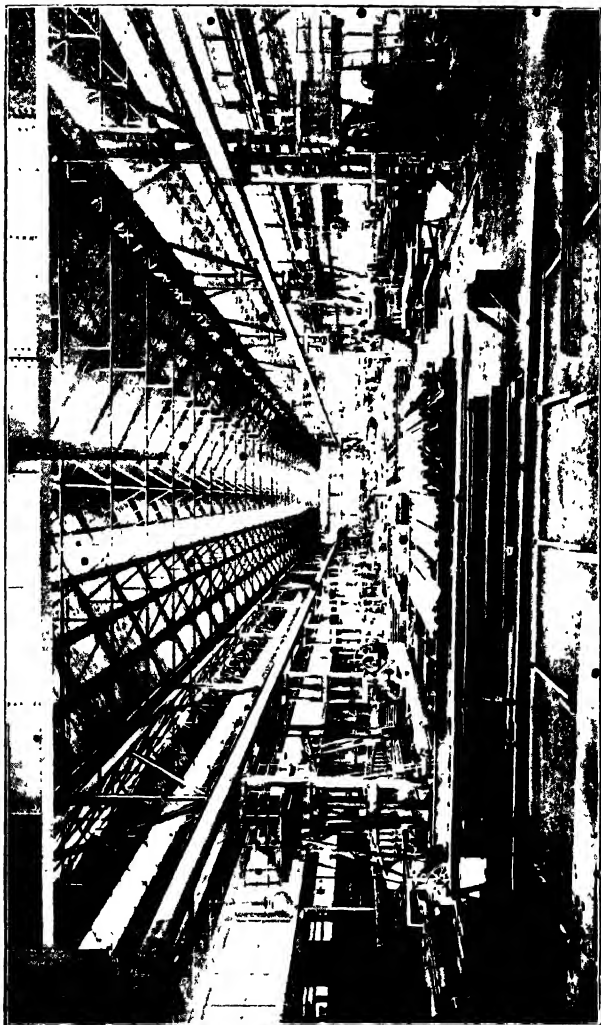


BRITANNIA ROLLING MILLS, NO. 1 MILL.

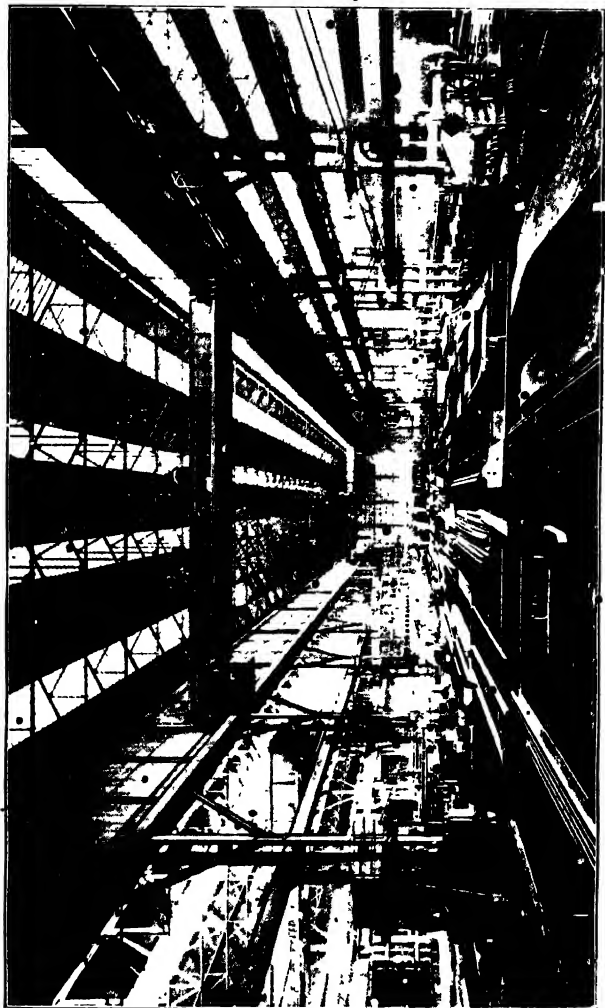
W. H. Heston



BRITANNIA ROLLING MILLS NO 2 MILL



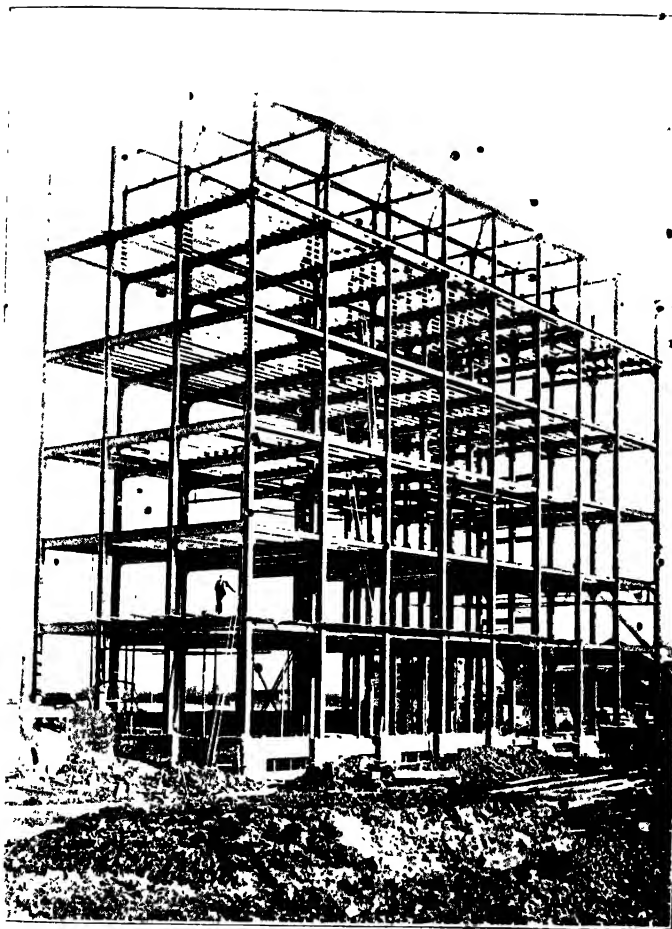
D. W. L. & Co. Ltd.
 CONSTRUCTIONAL DEPARTMENT. BRIDGE AND GIRDER SHOP. NO. 2 BAY.



CONSTRUCTIONAL DEPARTMENT. BRIDGE AND GIRDER SHOP, NO. 3 BAY



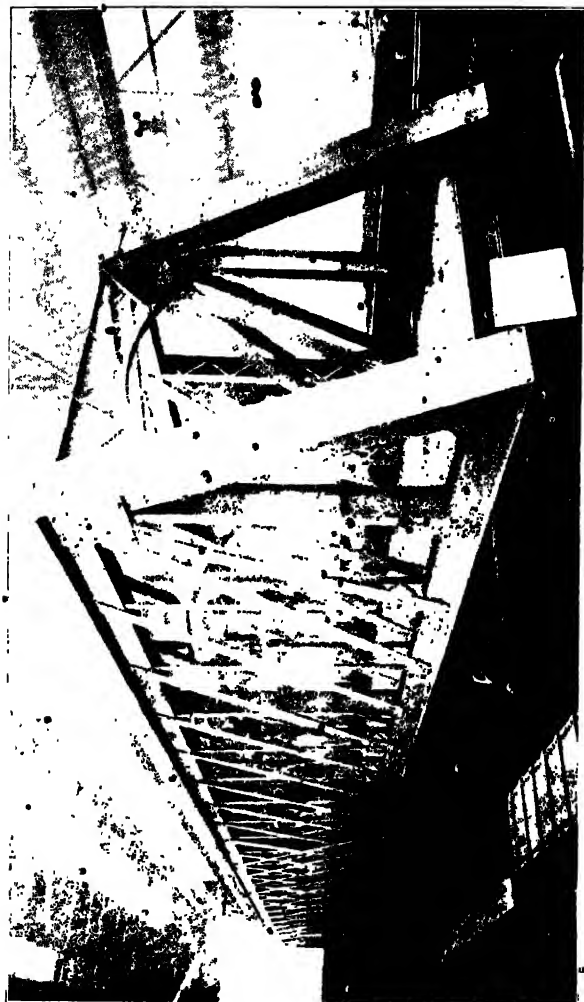
ELECTRIC TRAMWAY CAR SHED.
SUPPLIED AND ERECTED BY D L & CO LD



Dorman Long & Co. Ltd

Middlesbrough

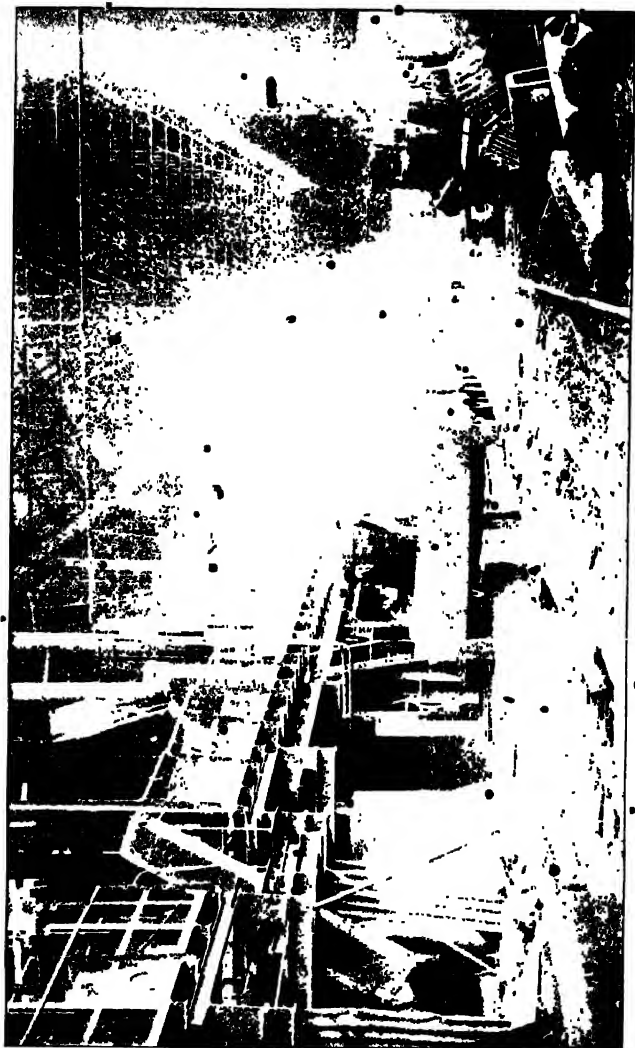
STEEL FRAME BUILDING.
 SUPPLIED AND ERECTED BY D L & CO. LD.



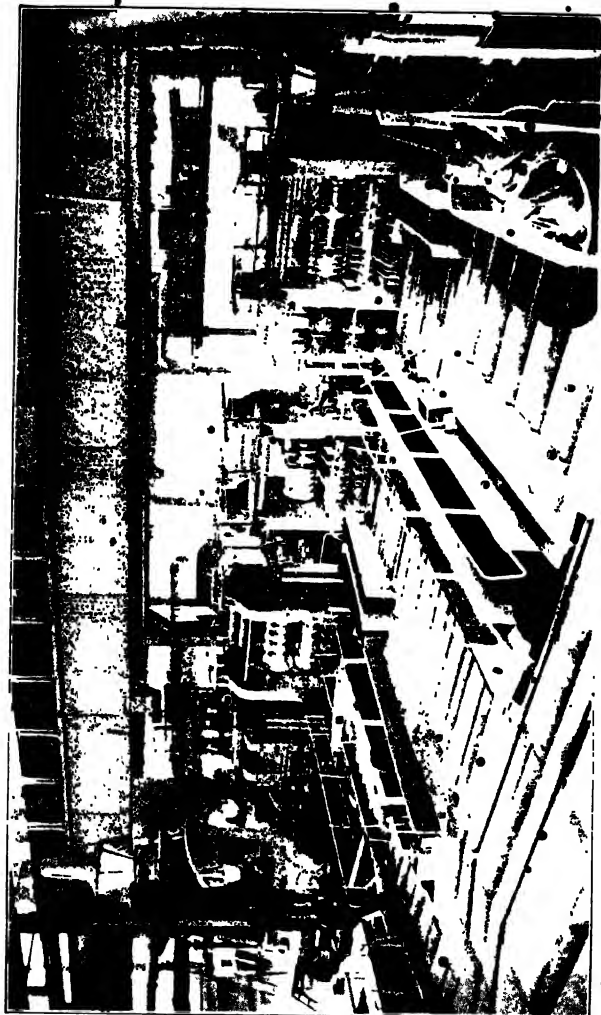
Middlesbrough

BRIDGE OF 200 FEET SPAN
BUILT BY D. L. & CO. LD

Dorman, Long & Co. Ltd.

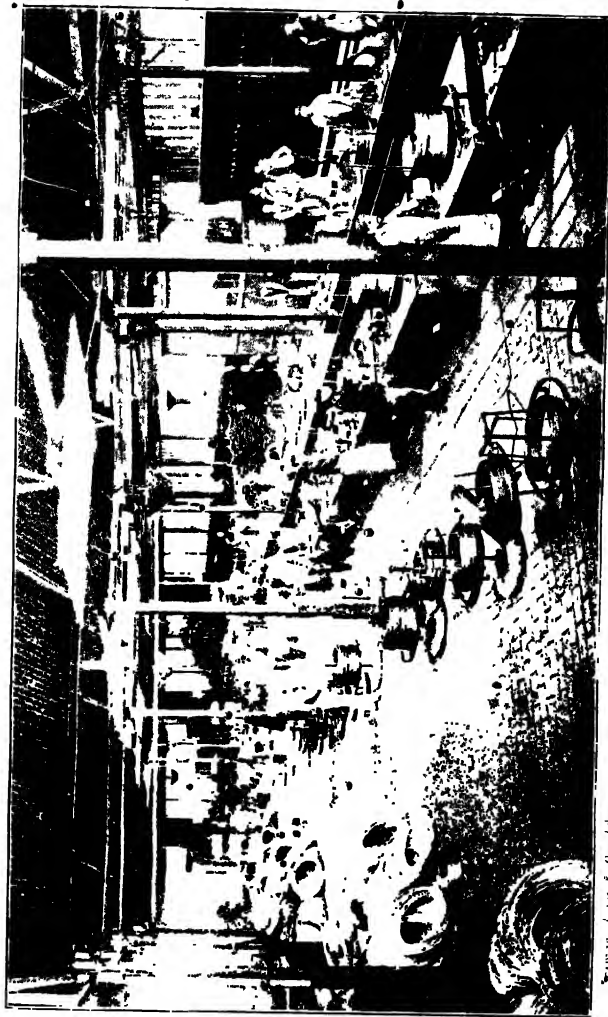


CLARENCE STEEL FURNACES



W. H. H. H. H. H.

CLARENCE ROLLING MILLS.



“From a q-simplicial

Journal of the



Middlebury, Vt.

SHEET DEPARTMENT, ROLLING MILLS.



Middlesbrough

SHEET DEPARTMENT. - CORRUGATING SHOP.

Dorman, Long & Co. Ltd.

PREFACE.

IN recent years there has been a large extension of the properties of this Company, and we feel that the several editions of our hand book—the first of which was issued in 1887—do not contain an adequate or complete account of the whole of our productions.

The property now comprises the following:—

Steel Furnaces.

Rolling Mills, for all forms of sectional material.

Constructional and Bridge Shops.

Sheet Department (Rolling Mills with Galvanizing
and Corrugating Shops).

Wire and Wire Rod Mills.

Rail, Billet, Bloom and Slab Mills.

A full description of the products of each department is given in the present edition.

We have endeavoured to bring before consumers the utility of our various products. The tabular and general information has been so arranged as to allow of an easy and convenient reference, for the selection of the most economical form, for any given purpose.

All the information has been very carefully prepared by our own staff. It is in accordance with the best modern

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DORMAN, LONG & CO. LIMITED.

practice, and meets the requirements of the leading Engineers, Architects, and others connected with Constructional Engineering, Shipbuilding and allied trades.

When the Engineering Standards Committee issued their list of British Standard Rolled Sections in 1903, the Company realised the advantages that would accrue from a general adoption of standard sections by both manufacturers and users, and at once made arrangements for rolling those that the market conditions appeared to demand. Certain sections, not included in the British Standard list, are also rolled by this Company to meet a special demand. Particulars of these will be found in the present edition.

Our steel is manufactured by the Basic Open Hearth process, which ensures an uniform and reliable product.

Our standard product for sectional material will give the following results under test:—

28/32 tons tensile stress per square inch.

20% elongation in eight inches.

40% reduction of area at point of fracture.

The steel is accepted by, and meets the requirements of, the several departments of His Majesty's Government, including the Board of Trade, War Office, India Office, Admiralty; also Lloyds and other surveys, and Engineers of the principal railways at home and abroad.

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The stock of sections carried at Middlesbrough, London and Melbourne is in lengths of every foot from 10 feet to 40 feet for ordinary sections, and longer lengths can sometimes be obtained from stock.

The trade margin allowed in rolling sectional material is $2\frac{1}{2}\%$ above or below the dimensions and weights listed, and we cannot undertake to execute any order without this allowance.

All sections, either from rolls or stock, are cut to a margin of 1" over or under specified lengths. An extra is charged for cutting to within $\frac{1}{8}$ " of exact length, and for machining square.

Attention is particularly directed to the full and complete list of sections designed for Shipbuilding purposes, for which line of business our mills are specially adapted.

The Construction Shops have been specially equipped for the rapid production of all classes of structural work, including steel frame buildings, workshops and bridges, of all sizes. A few illustrations of work executed are included in this edition. As manufacturers of all classes of material required for such work, we carry at all times a large stock, and are thus in a most favourable position for the rapid execution of large or small contracts.

Our Constructional Department maintains a large and competent staff, prepared to submit designs and estimates at any time to meet customers' requirements.

DORMAN, LONG & CO. LIMITED.

At our London yard—Nine Elms Lane—a large quantity of material is always kept in stock, and as this branch also possesses well equipped shops, structural work of all classes can be obtained at short notice.

This Company have also a branch establishment at Melbourne, Australia, where an adequate stock of Beams, Angles and other material is held. This branch is also equipped to execute orders for all kinds of structural work.

We have endeavoured to standardise the details of ordinary constructional work to facilitate deliveries and effect economy for purchasers. If customers specify any of our standards for their requirements, we can give them better service than if their requirements are special or out of the ordinary, though these latter of course will have our best attention.

We trust that the form of the present pocket companion will be found acceptable. The accuracy attained in the calculations is such, that we have every confidence in recommending the use of the book to all requiring material manufactured by the Company, or who may be engaged in designing structures for which our products are adapted.

DORMAN, LONG & CO., LIMITED.

NOTES ON SECTIONS

Reference Marks.—The reference marks generally adopted throughout this work either indicate those sections determined by the British Standards Committee, or such as are being rolled to meet special demand; the former have the prefix B.S. (viz.:—British Standard), and the latter D.L. (viz.:—Dorman, Long & Co. Ld.), thus affording a ready means of identification.

Sections marked *.—On referring to diagrams and tables, certain sections will be found marked with an asterisk.

Up to the present, the demand for these sections has been so limited that they have not been regularly rolled, neither are they kept in stock. They will be supplied, however, on receipt of orders for a sufficient quantity to warrant putting in the rolls.

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Weight of Steel.—All calculations for weights are based on a piece of steel one square inch sectional area and one foot long, weighing 3·4 lbs., or one cubic foot of steel weighing 489·6 lbs.

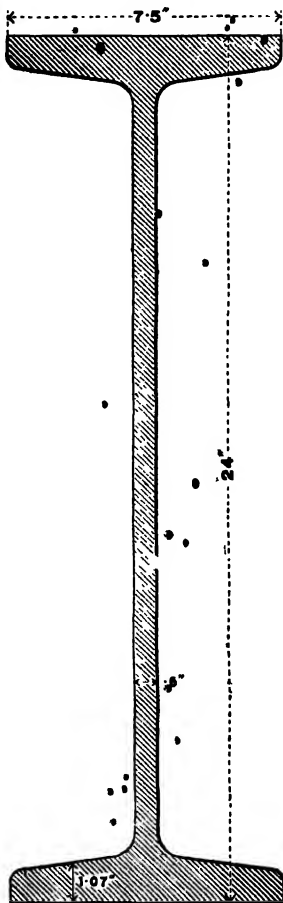
Mode of ordering material.—I beams, channels, zeds, bulb angles and bulb tees, should be specified according to the weights per foot given in the diagrams and tables, rails to the weights per yard given, but angles, tees, flats, &c., to the thicknesses required.

Variation from published weights or thicknesses.—The minimum weights or thicknesses given in the diagrams and tables cannot be decreased, but may be exceeded when the tonnage ordered is sufficient to warrant a change being made; the effect upon the profile being as indicated on page 32.

It should be observed, however, that such change is only of limited extent.

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I BEAMS



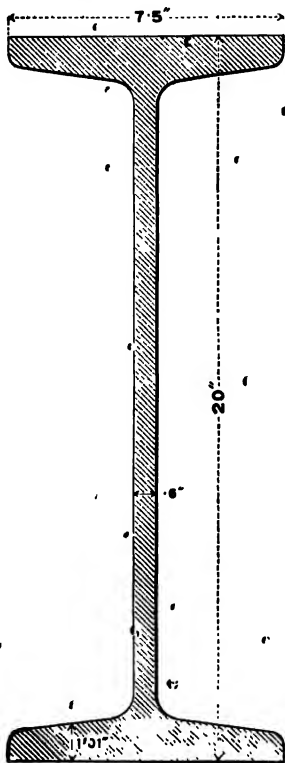
B.S.B. 30.

24" x 7½" x 100 lbs per foot.

FOR PROPERTIES & SAFE LOADS SEE PAGES 34, 35, 46 & 47.

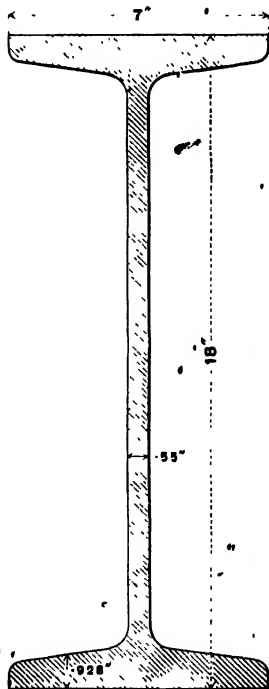
DORMAN, LONG & CO. LIMITED.

I BEAMS



B.S.B. 29.

20" x 7½" x 89 lbs per foot



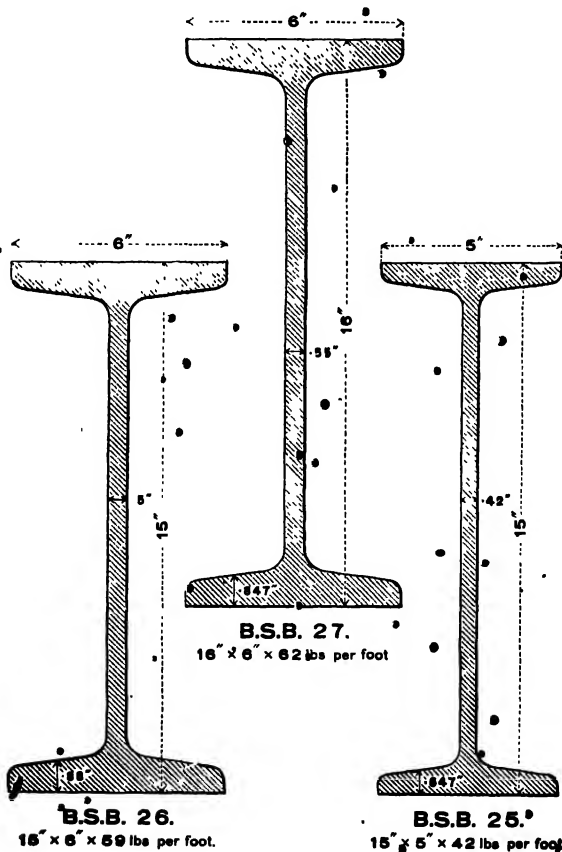
B.S.B. 28.

18" x 7" x 75 lbs per foot

FOR PROPERTIES & SAFE LOADS SEE PAGES 34, 35, 46 & 47.

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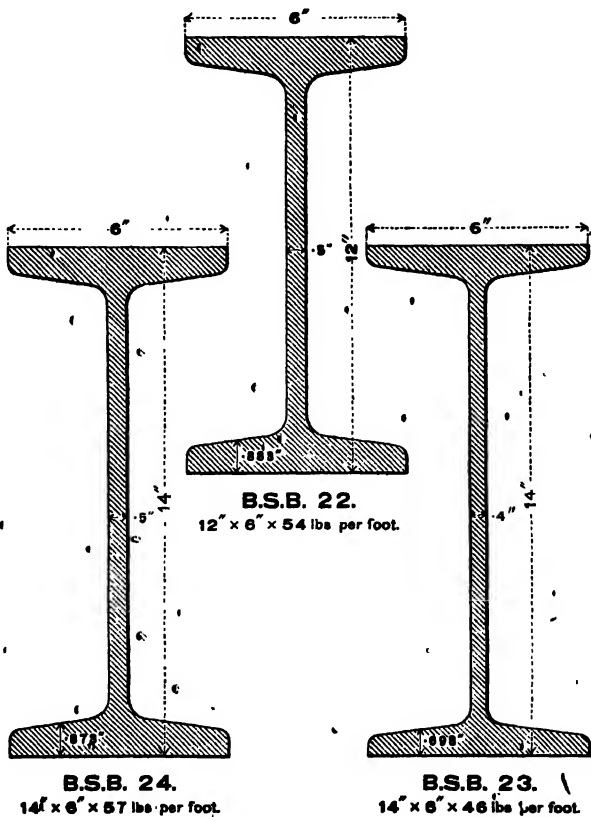
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FOR PROPERTIES & SAFE LOADS SEE PAGES 34, 35, 46 & 47.

DORMAN, LONG & CO. LIMITED.

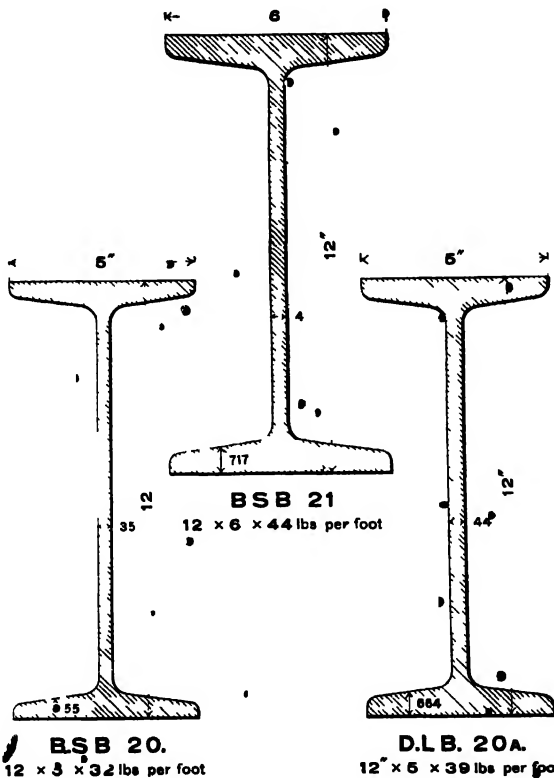
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FOR PROPERTIES & SAFE LOADS SEE PAGES 34, 35, 46 & 47.

DORMAN, LONG & CO LIMITED

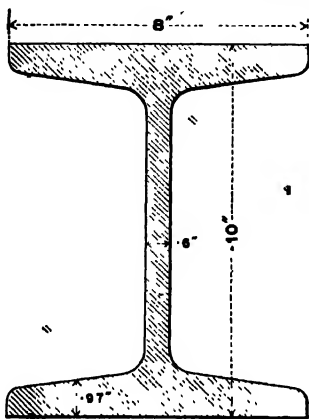
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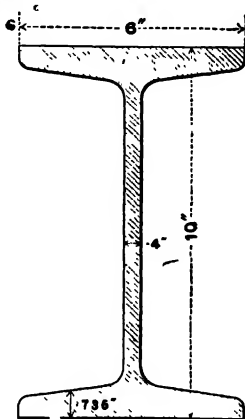
FOR PROPERTIES & SAFE LOADS SEE PAGES 34, 35, 46 & 47.

DORMAN, LONG & CO. LIMITED.

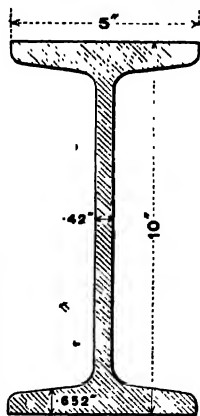
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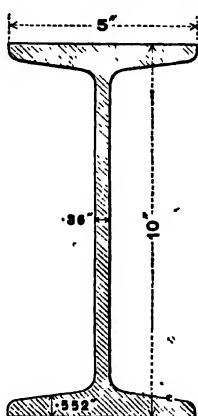
B.S.B. 19.
10" x 8" x 70 lbs per foot.



B.S.B. 18.
10" x 6" x 42 lbs per foot.



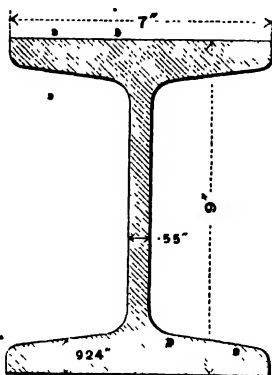
D.L.B. 17A
10" x 5" x 35 lbs per foot.



B.S.B. 17.
10" x 5" x 30 lbs per foot.

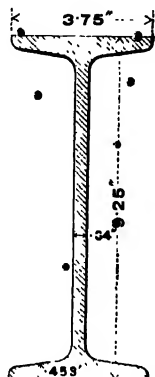
FOR PROPERTIES & SAFE LOADS SEE PAGES 34, 35, 46 & 47.

I BEAMS.



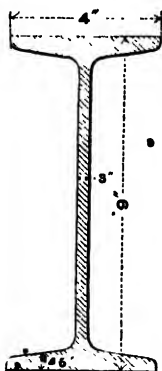
B.S.B. 16.

9" x 7" x 58 lbs per foot.



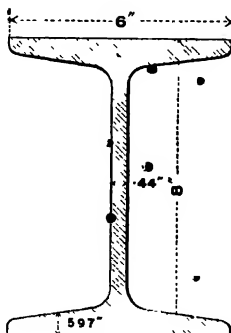
D.L.B. 15A.*

8 1/4" x 3 1/4" x 21 1/2 lbs per foot



B.S.B. 15.

9" x 4" x 21 lbs per foot.

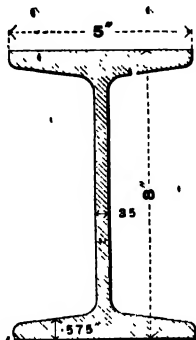


B.S.B. 14.

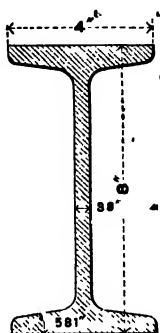
8" x 6" x 35 lbs per foot.

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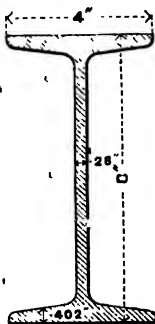
I BEAMS

**B.S.B. 13.**

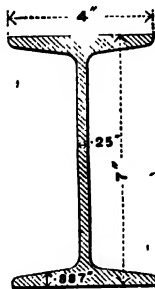
8" x 5" x 28 lbs per foot

**D.L.B. 12A.**

8" x 4" x 25 lbs per foot

**B.S.B. 12.**

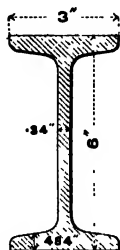
8" x 4" x 18 lbs per foot.

**B.S.B. 11.**

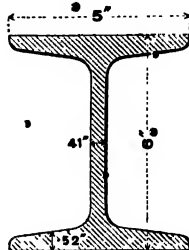
7" x 4" x 16 lbs per foot.

FOR PROPERTIES & SAFE LOADS SEE PAGES 34, 35, 46 & 47.

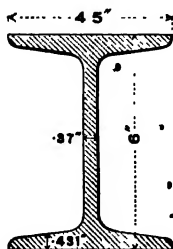
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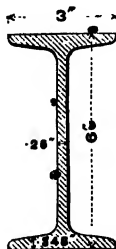
D.L.B. 8A.
6" x 3" x 16 lbs per foot.



B.S.B. 10.
6" x 5" x 25 lbs per foot.



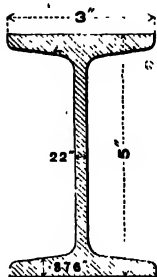
B.S.B. 9.
6" x 4 1/2" x 20 lbs per foot.



B.S.B. 8.
6" x 3" x 12 lbs per foot.

DORMAN, LONG & CO. LIMITED.

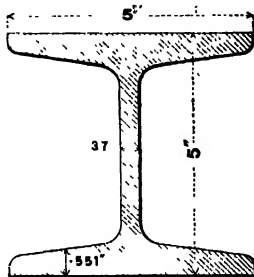
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**B.S.B. 6.**

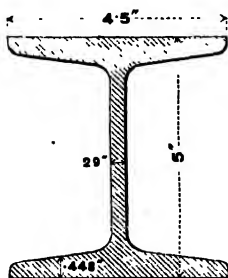
5" x 3" x 11 lbs per foot.

**D.L.B. 5A.**

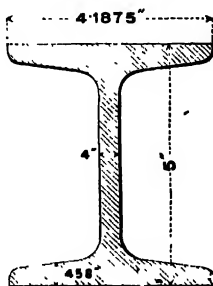
4 1/4" x 1 1/4" x 10 lbs per foot

**D.L.B. 7A*.**

5" x 5" x 24 lbs per foot

**B.S.B. 7.**

5" x 4 1/4" x 18 lbs per foot.

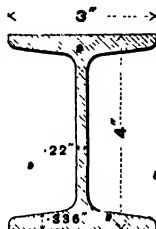
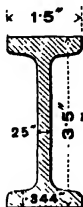
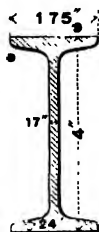
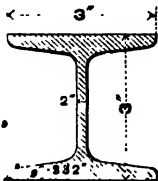
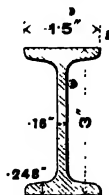
**D.L.B. 6A.**

5" x 4 3/8" x 19 lbs per foot.

FOR PROPERTIES & SAFE LOADS SEE PAGES 34, 35, 46 & 47.

DORMAN, LONG & CO. LIMITED.

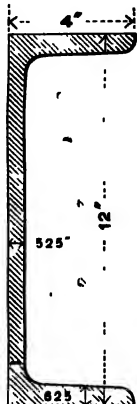
I. BEAMS .

**B.S.B. 5.** $4\frac{1}{2} \times 1\frac{1}{4} \times 6\frac{1}{2}$ lbs per foot.**B.S.B. 4.** $4 \times 3 \times 9\frac{1}{2}$ lbs per foot.**D.L.B. 3A.** $4 \times 1\frac{1}{4} \times 8$ lbs per foot.**D.L.B. 1A.** $3\frac{1}{2} \times 1\frac{1}{4} \times 6$ lbs per foot.**B.S.B. 3.** $4 \times 1\frac{1}{4} \times 5$ lbs per foot.**B.S.B. 2.*** $3 \times 3 \times 8\frac{1}{2}$ lbs per foot.**B.S.B. 1.** $3 \times 1\frac{1}{4} \times 4$ lbs per foot.

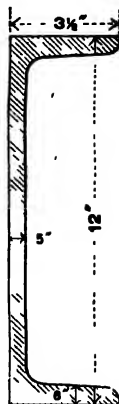
FOR PROPERTIES & SAFE LOADS SEE PAGES 34, 35, 46 & 47.

DORMAN, LONG & CO. LIMITED.

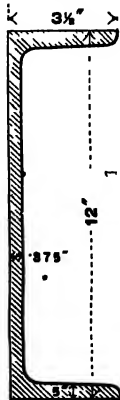
CHANNELS

**B.S.C. 26.**

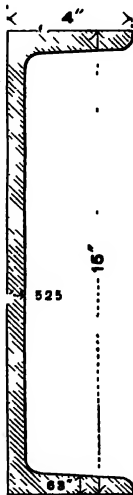
12" x 4" x 36 47 lbs per foot

**B.S.C. 25.**

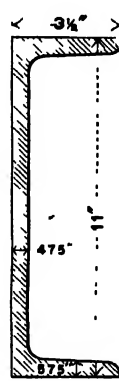
12" x 3 1/4" x 32 88 lbs per foot

**B.S.C. 24.**

12" x 3 1/4" x 26 10 lbs per foot.

**B.S.C. 27.**

15" x 4" x 41 94 lbs per foot

**B.S.C. 22.**

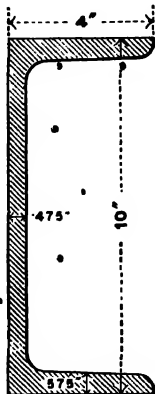
11" x 3 1/4" x 29 82 lbs per foot

Each Section will be the correct profile for the weights given, but for increased weights the Section will be modified as indicated on page 32.

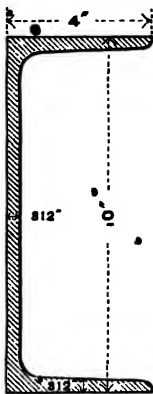
FOR TABLE OF PROPERTIES SEE PAGES 36 AND 37.

DORMAN, LONG & CO. LIMITED.

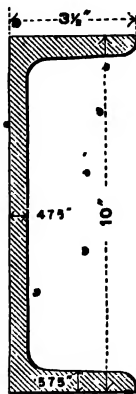
CHANNELS

**B.S.C. 21.**

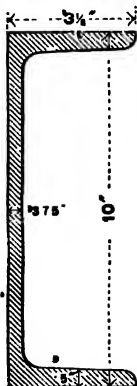
10" x 4" x 30.16 lbs per ft.

**D.L.C. 21A.***

10" x 4" x 18.86 lbs per ft.

**B.S.C. 20.**

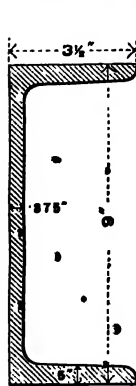
10" x 3 1/2" x 28.21 lbs per ft.

**B.S.C. 19.**

10" x 3 1/2" x 23.55 lbs per ft.

**B.S.C. 17.**

9" x 3 1/2" x 25.39 lbs per ft.

**B.S.C. 16.**

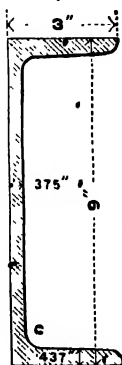
9" x 3 1/2" x 22.27 lbs per ft.

Each Section will be to correct profile for the weights given, but for increased weights the Section will be modified as indicated on page 32.

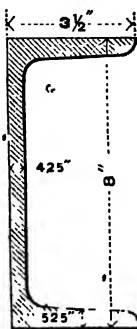
FOR TABLE OF PROPERTIES SEE PAGES 36 AND 37.

DORMAN, LONG & CO. LIMITED.

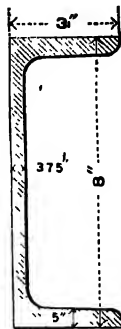
CHANNELS

**B.S.C. 15.**

9" x 3" x 19.37 lbs per ft.

**B.S.C. 13.**

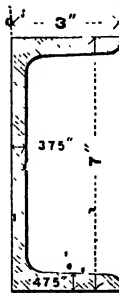
8" x 3 1/2" x 22.72 lbs per ft.

**B.S.C. 12.***

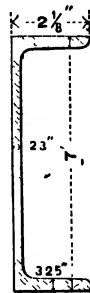
8" x 3" x 19.3 lbs per ft.

**B.S.C. 70.**

7" x 3 1/2" x 20.23 lbs per ft.

**B.S.C. 9.**

7" x 3" x 17.56 lbs per ft.

**D.L.C. 9A.***

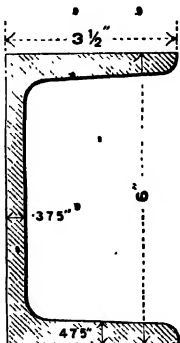
7" x 2 1/8" x 9.75 lbs per ft.

Each Section will be to correct profile for the weights given, but for increased weights the Section will be modified as indicated on page 32.

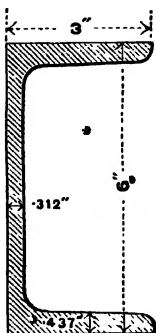
FOR TABLE OF PROPERTIES SEE PAGES 36 AND 37

DORMAN, LONG & CO. LIMITED.

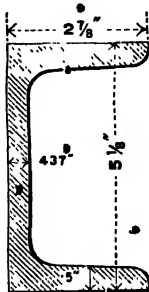
CHANNELS

**B.S.C. 8.**

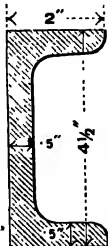
6" x 3 1/4" x 17.9 lbs per ft.

**B.S.C. 6.**

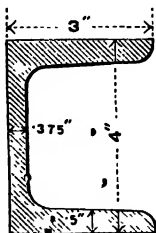
6" x 3" x 14.49 lbs per ft.

**D.L.C. 5A.**

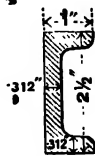
5 1/8" x 2 7/8" x 16.08 lbs per ft.

**D.L.C. 4A.**

4 1/4" x 2" x 12.92 lbs per ft.

**D.L.C. 3A.**

4" x 3" x 14.20 lbs per ft.

**D.L.C. 2A.**

2 1/4" x 1" x 4.14 lbs per ft.

Each Section will be to correct profile for the weights given, but for increased weights the Section will be modified as indicated on page 32.

FOR TABLE OF PROPERTIES SEE PAGES 36 AND 37.

DORMAN, LONG & CO. LIMITED.

UNEQUAL ANGLES

B.S.U.A. 25.
Thicknesses
 $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ ".

B.S.U.A. 24.
Thicknesses
 $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ ".

B.S.U.A. 22.
Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ".

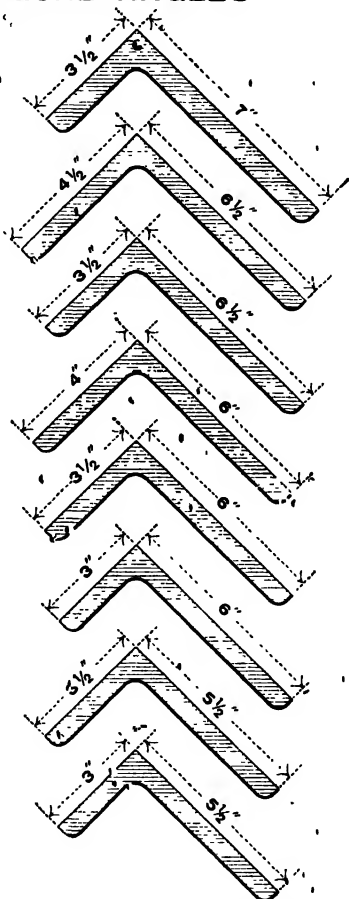
B.S.U.A. 21.
Thicknesses
 $\frac{1}{4}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ".

B.S.U.A. 20.
Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ".

D.L.U.A. 20A.
Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ".

B.S.U.A. 19.
Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ".

B.S.U.A. 18.*
Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ".



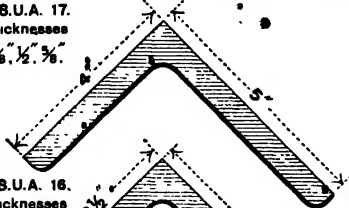
Each Section will be to correct profile for the thicknesses given, but for intermediate or greater thicknesses the Section will be modified as indicated on page 32.

FOR TABLE OF PROPERTIES SEE PAGES 38 AND 39.

DORMAN, LONG & CO. LIMITED.

UNEQUAL ANGLES

B.S.U.A. 17.
Thicknesses
 $\frac{3}{16}$ " $\frac{1}{2}$ " $\frac{3}{8}$ "



B.S.U.A. 4.
Thicknesses
 $\frac{3}{16}$ " $\frac{1}{4}$ " $\frac{5}{16}$ "



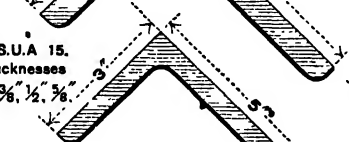
B.S.U.A. 16.
Thicknesses
 $\frac{3}{16}$ " $\frac{1}{2}$ " $\frac{3}{8}$ "



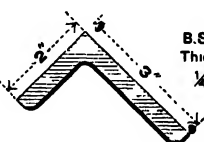
B.S.U.A. 5.
Thicknesses
 $\frac{1}{4}$ " $\frac{3}{16}$ " $\frac{3}{8}$ "



B.S.U.A. 15.
Thicknesses
 $\frac{5}{16}$ " $\frac{3}{8}$ " $\frac{1}{2}$ " $\frac{3}{8}$ "



B.S.U.A. 6.
Thicknesses
 $\frac{1}{4}$ " $\frac{3}{8}$ " $\frac{1}{2}$ "



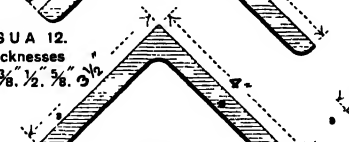
B.S.U.A. 14*
Thicknesses
 $\frac{5}{16}$ " $\frac{3}{8}$ " $\frac{1}{2}$ " $\frac{3}{8}$ "



B.S.U.A. 7.
Thicknesses
 $\frac{1}{4}$ " $\frac{3}{8}$ " $\frac{1}{2}$ "



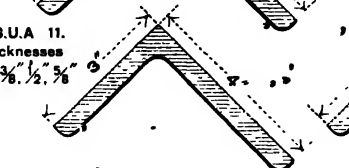
B.S.U.A. 12.
Thicknesses
 $\frac{5}{16}$ " $\frac{3}{8}$ " $\frac{1}{2}$ " $\frac{3}{8}$ "



B.S.U.A. 8.
Thicknesses
 $\frac{5}{16}$ " $\frac{3}{8}$ " $\frac{1}{2}$ "



B.S.U.A. 11.
Thicknesses
 $\frac{5}{16}$ " $\frac{3}{8}$ " $\frac{1}{2}$ " $\frac{3}{8}$ "



B.S.U.A. 9.
Thicknesses
 $\frac{5}{16}$ " $\frac{3}{8}$ " $\frac{1}{2}$ " $\frac{3}{8}$ "

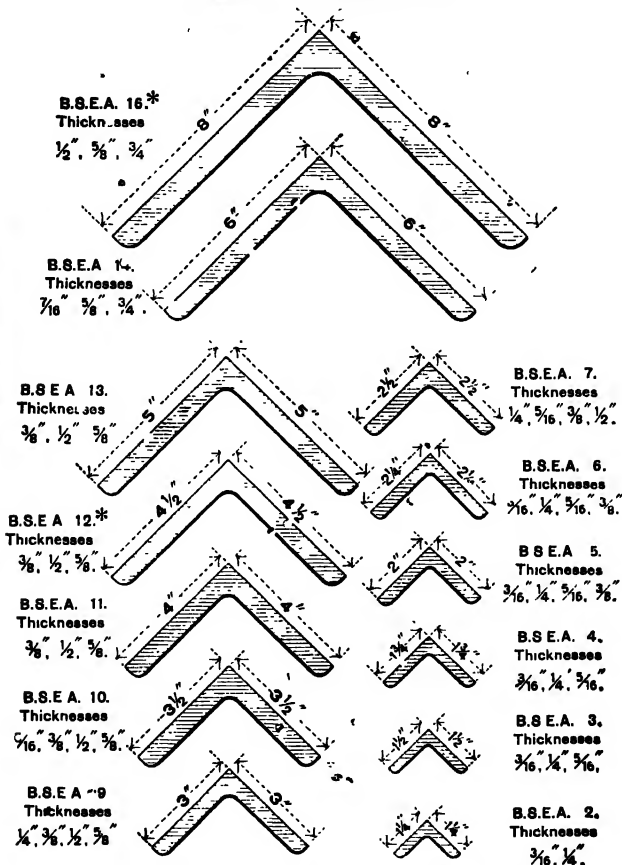


Each Section will be to correct profile for the thicknesses given, but for intermediate or greater thicknesses the Section will be modified as indicated on page 32.

FOR TABLE OF PROPERTIES SEE PAGES 38 AND 39.

DORMAN, LONG & CO. LIMITED.

EQUAL ANGLES



Each Section will be to correct profile for the thicknesses given, but for intermediate or greater thicknesses the Sections will be modified as indicated on page 32.

FOR TABLE OF PROPERTIES SEE PAGE 40.

DORMAN, LONG & CO. LIMITED.

BULB ANGLES

B.S.B.A. 20.

12" x 4" x 36.46 lbs per ft.

B.S.B.A. 19.

11" x 3 1/2" x 30.44 lbs per ft.

B.S.B.A. 18.

10" x 3 1/2" x 26.87 lbs per ft.

B.S.B.A. 16.

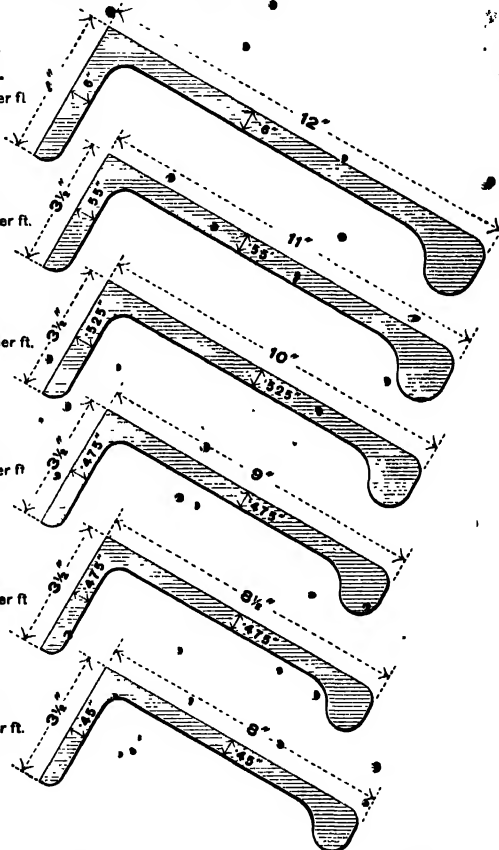
9" x 3 1/2" x 22.70 lbs per ft.

B.S.B.A. 14.

8 1/2" x 3 1/2" x 21.55 lbs per ft.

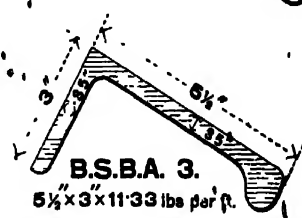
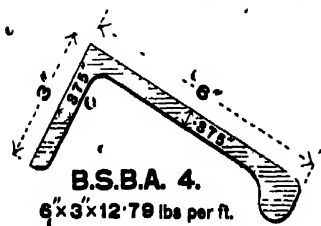
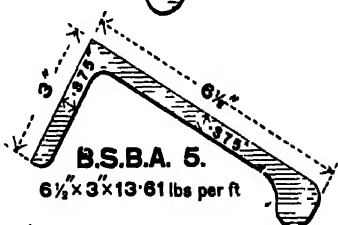
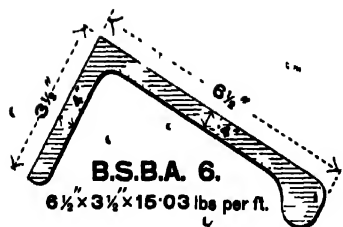
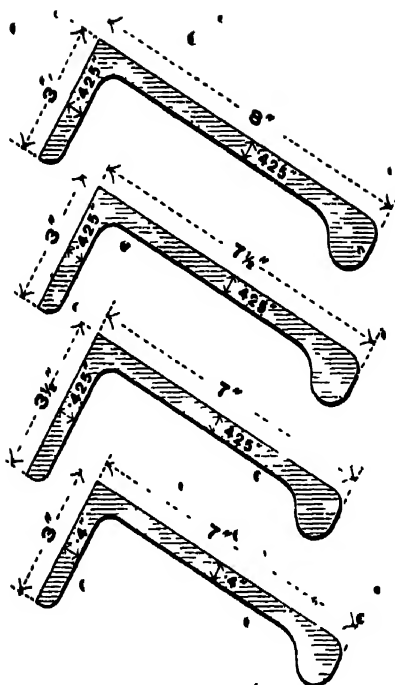
B.S.B.A. 12.

8" x 3 1/2" x 19.66 lbs per ft.



Each Section will be to correct profile for the weights given, but for increased weights the Section will be modified as indicated on page 32.

FOR TABLE OF PROPERTIES SEE PAGES 42 AND 43.



DORMAN, LONG & CO. LIMITED.

ZEDS

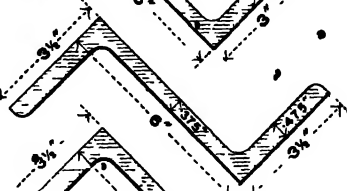
D.L.Z. 2A.
12.26 lbs per foot.



B.S.Z. 3.
14.17 lbs per foot



B.S.Z. 4.
17.88 lbs per foot



B.S.Z. 5.
20.22 lbs per foot



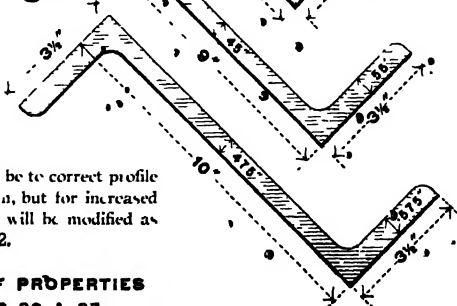
B.S.Z. 6.
23.88 lbs per foot



B.S.Z. 7.
25.33 lbs per foot



B.S.Z. 8.
28.16 lbs per foot.

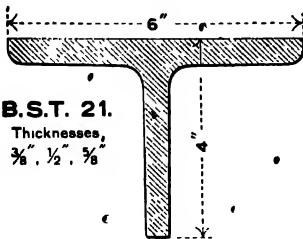
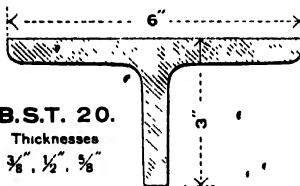
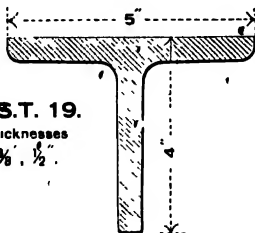
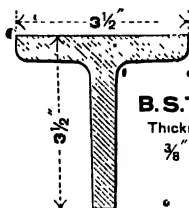
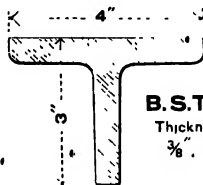
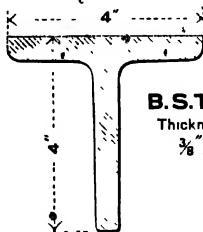
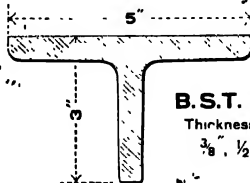


Each Section will be to correct profile for the weight given, but for increased weights the Section will be modified as indicated on page 32.

**FOR TABLE OF PROPERTIES
SEE PAGES 36 & 37.**

DORMAN, LONG & CO. LIMITED.

TEES

B.S.T. 21.Thicknesses,
 $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ "**B.S.T. 20.**Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ "**B.S.T. 19.**Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ "**B.S.T. 13.**Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ "**B.S.T. 14.**Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ "**B.S.T. 15.**Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ "**B.S.T. 17.**Thicknesses
 $\frac{3}{8}$ ", $\frac{1}{2}$ "

Each Section will be to correct profile for the thicknesses given.
Tale and stalk of equal thickness.

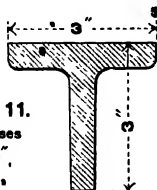
FOR TABLE OF PROPERTIES SEE PAGE 41.

DORMAN, LONG & CO. LIMITED.

TEES

B.S.T. 11.

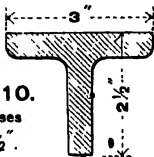
Thicknesses

 $\frac{3}{8}$ " , $\frac{1}{2}$ "**B.S.T. 3.**

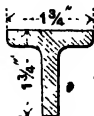
Thicknesses

 $\frac{3}{16}$ " , $\frac{1}{4}$ "**B.S.T. 10.**

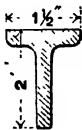
Thicknesses

 $\frac{3}{8}$ " , $\frac{1}{2}$ "**B.S.T. 4.**

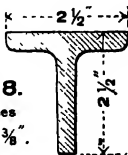
Thicknesses

 $\frac{1}{4}$ " , $\frac{3}{16}$ "**B.S.T. 5.**

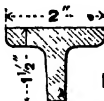
Thicknesses

 $\frac{1}{4}$ " , $\frac{3}{16}$ "**B.S.T. 8.**

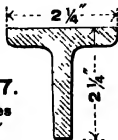
Thicknesses

 $\frac{1}{4}$ " , $\frac{3}{16}$ " , $\frac{3}{8}$ "**D.L.T. 6A.**

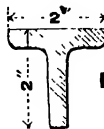
Thicknesses

 $\frac{1}{4}$ " , $\frac{3}{8}$ "**B.S.T. 7.**

Thicknesses

 $\frac{1}{4}$ " , $\frac{3}{8}$ "**B.S.T. 6.**

Thicknesses

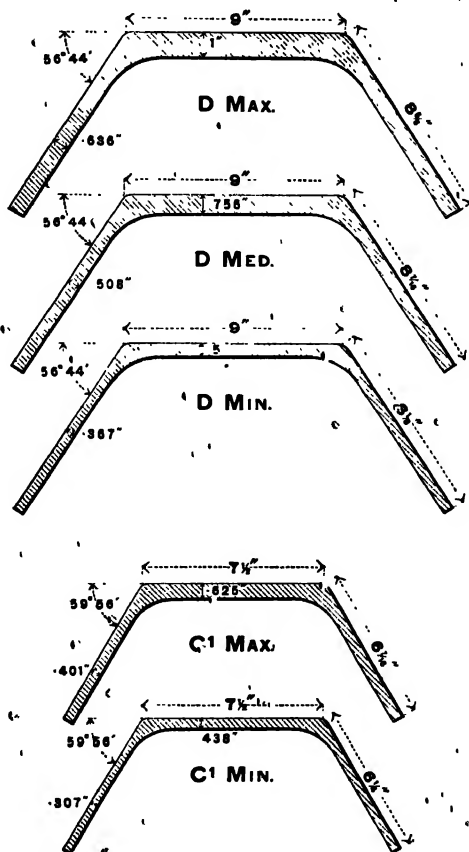
 $\frac{1}{4}$ " , $\frac{3}{8}$ "

Each Section will be to correct profile for the thicknesses given.
Table, and stalk of equal thickness.

FOR TABLE OF PROPERTIES SEE PAGE 41.

DORMAN, LONG & CO. LIMITED.

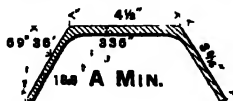
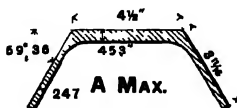
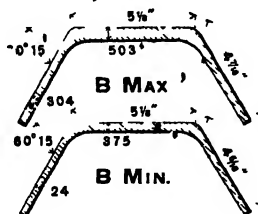
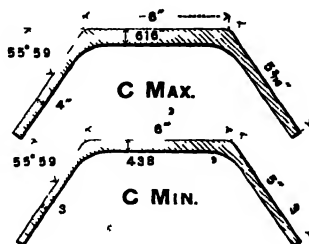
STEEL TROUGHING



FOR ABOVE, BUILT UP AS FLOORING, SEE PAGES 126 TO 149.

DORMAN, LONG & CO. LIMITED.

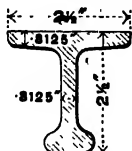
STEEL TROUGHING



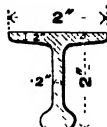
FOR ABOVE, BUILT UP AS FLOORING, SEE PAGES 123 TO 140.

DORMAN, LONG & CO. LIMITED.

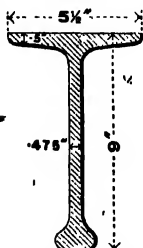
BULB TEES



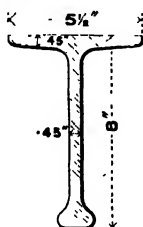
D.L.B.T. 1A.

 $2\frac{1}{2} \times 2\frac{1}{2} \times 5.98$ lbs per ft.

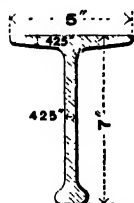
D.L.B.T. 1B.

 $2 \times 2 \times 3.2$ lbs per ft

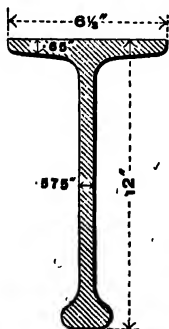
B.S.B.T. 3.*

 $9 \times 5\frac{1}{2} \times 26.76$ lbs per ft.

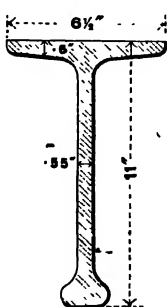
B.S.B.T. 2.*

 $8 \times 5\frac{1}{2} \times 22.78$ lbs per ft.

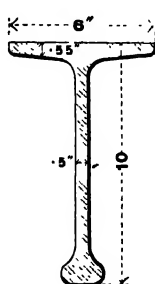
B.S.B.T. 1.*

 $7 \times 5 \times 19.01$ lbs per ft

B.S.B.T. 6.*

 $12 \times 6\frac{1}{2} \times 42.49$ lbs per ft.

B.S.B.T. 5.*

 $11 \times 6\frac{1}{2} \times 37.86$ lbs per ft.

B.S.B.T. 4.*

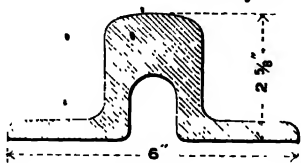
 $10 \times 6 \times 31.6$ lbs per ft.

Each Section will be to correct profile for the weights given, but for incr. ased weights the Section will be modified as indicated on page 32.

FOR TABLE OF PROPERTIES SEE PAGES 42 AND 43.

DORMAN, LONG & CO. LIMITED.

RAILS

**B.R. 1.**

56 lbs per yard.

**B.R. 2.**

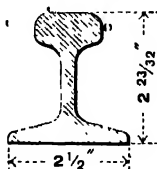
24 lbs per yard.

**B.R. 3.**

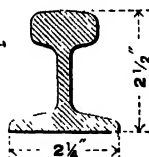
18 lbs per yard.

**B.R. 4.**

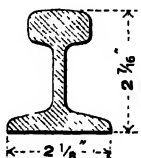
16 lbs per yard.

**F.B.R. 1.**

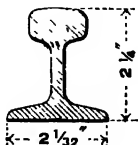
24 lbs per yard.

**F.B.R. 2.**

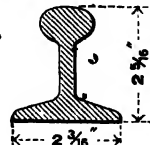
20 lbs per yard.

**F.B.R. 3.**

18 lbs per yard.

**F.B.R. 4.**

16 lbs per yard.

**F.B.R. 5.**

16 lbs per yard.

DORMAN, LONG & CO. LIMITED.

ROUNDS, SQUARES AND FLATS.

ROUNDS.



DIAMETERS.

$\frac{1}{2}$ "	$\frac{3}{8}$ "	$\frac{5}{8}$ "	$\frac{1}{2}$ "	$\frac{3}{4}$ "
$\frac{7}{8}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	1"	$1\frac{1}{8}$ "
$1\frac{1}{8}$ "	$1\frac{3}{8}$ "	$1\frac{1}{4}$ "	$1\frac{5}{8}$ "	$1\frac{3}{4}$ "
$1\frac{7}{8}$ "	$1\frac{1}{2}$ "	$1\frac{5}{8}$ "	$1\frac{3}{4}$ "	$1\frac{7}{8}$ "
2"	$2\frac{1}{8}$ "	$2\frac{1}{4}$ "	$2\frac{3}{8}$ "	$2\frac{1}{2}$ "

SQUARES.



SIDES.

$\frac{1}{2}$ "	$\frac{3}{8}$ "	$\frac{5}{8}$ "	$\frac{1}{2}$ "	$\frac{3}{4}$ "
$\frac{7}{8}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	1"	$1\frac{1}{8}$ "
$1\frac{1}{8}$ "	$1\frac{3}{8}$ "	$1\frac{1}{4}$ "	$1\frac{5}{8}$ "	$1\frac{3}{4}$ "
$1\frac{7}{8}$ "	$1\frac{1}{2}$ "	$1\frac{5}{8}$ "	$1\frac{3}{4}$ "	$1\frac{7}{8}$ "
2"	$2\frac{1}{8}$ "	$2\frac{1}{4}$ "		

FLATS.



Width Inches	Thickness		Width Inches	Thickness	
	Minimum	Maximum		Minimum	Maximum
24	$\frac{1}{8}$	$\frac{5}{8}$	$3\frac{1}{2}$	$\frac{1}{4}$	$\frac{3}{4}$
$20\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{8}$	$3\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{4}$
18	$\frac{3}{8}$	$\frac{3}{4}$	3	$\frac{1}{4}$	$\frac{3}{4}$
16	$\frac{3}{8}$	$\frac{3}{4}$	$2\frac{3}{4}$	$\frac{1}{4}$	$\frac{3}{4}$
14	$\frac{3}{8}$	$\frac{3}{4}$	$2\frac{1}{2}$	$\frac{1}{4}$	$\frac{3}{4}$
13	$\frac{3}{8}$	$\frac{3}{4}$	$2\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{4}$
12	$\frac{3}{8}$	$\frac{3}{4}$	2	$\frac{1}{4}$	$\frac{3}{4}$
10	$\frac{3}{8}$	$\frac{3}{4}$	$1\frac{3}{4}$	$\frac{1}{4}$	$\frac{5}{8}$
9	$\frac{3}{8}$	$\frac{3}{4}$	$1\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$
8	$\frac{3}{8}$	$\frac{3}{4}$	$1\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$
4	$\frac{1}{4}$	$\frac{3}{4}$	1	$\frac{1}{4}$	$\frac{1}{2}$
$3\frac{3}{4}$	$\frac{1}{4}$	$\frac{3}{4}$	...	...	...

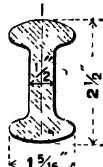
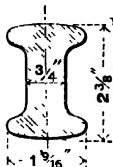
NOTE.—Flats of greater thickness than the above will have the edges slightly rounded

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MISCELLANEOUS SECTIONS

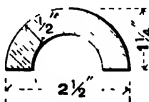
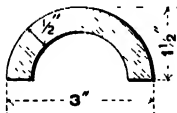


No. 3 HATCH.

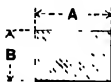
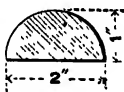
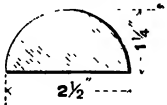
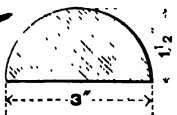


BOBBIN SECTIONS.

HOLLOW HALF ROUNDS.



SOLID HALF ROUNDS.



NUT STEEL

FENCING,
STANDARD.

2" x 1/2" x 3/8"



RIVET BARS.

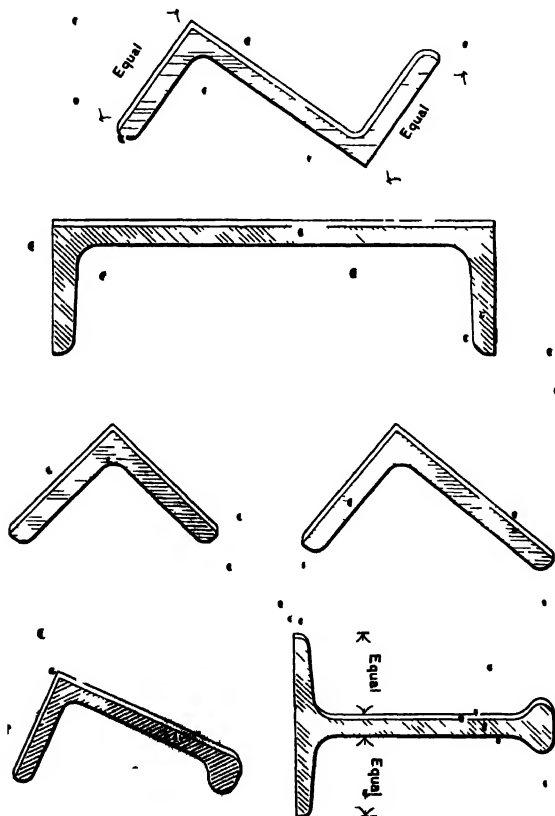
Sizes	
A x B	A x B
1 11/16" x 1 3/16"	1 3/8" x 3/4"
1 9/16" x 3/4"	1 1/2" x 3/4"
1 7/16" x 3/4"	1 1/4" x 3/4"
1 1/2" x 1"	1 3/16" x 1"

Diameters			
$\frac{1}{2}$ "	$\frac{23}{32}$ "	$\frac{29}{32}$ "	$1\frac{1}{4}$ "
$\frac{9}{16}$ "	$\frac{3}{4}$ "	$\frac{15}{16}$ "	$1\frac{3}{8}$ "
$\frac{19}{32}$ "	$\frac{25}{32}$ "	$\frac{31}{32}$ "	$1\frac{1}{2}$ "
$\frac{5}{8}$ "	$\frac{13}{16}$ "	1"	$1\frac{3}{4}$ "
$\frac{27}{32}$ "	$\frac{27}{32}$ "	$1\frac{1}{8}$ "	$1\frac{3}{4}$ "
$\frac{11}{16}$ "	$\frac{7}{8}$ "		

DORMAN, LONG & CO. LIMITED.

**DIAGRAM SHÉWING PROFILES OBTAINED WHEN
SECTIONS ARE ROLLED OF THICKNESSES OTHER
THAN THOSE GIVEN ON THE PRECEDING PAGES**

The hatched portions indicate correct profiles, the blank portions
the added material



DORMAN, LONG & CO. LIMITED.

DIMENSIONS, PROPERTIES, &c., OF SECTIONS.

Dimensions and Properties.—Complete tables are given of dimensions and properties of the various sections illustrated.

The areas and properties have been carefully calculated on correct profiles, and full sections without holing; all fillets, rounded corners, taper of flanges, &c., being taken into consideration.

Least Radius of Gyration.—The least radius of gyration has been determined for all sections, and will be found in the tables.

In sections such as I beams, channels, tees and equal angles, which have an axis of symmetry, this radius is either about that axis or one at right angles to it. In the case of unequal angles, bulb angles and zed bars, having no axis of symmetry, the position of the axis, about which the radius is least, has been calculated and is given in the tables; this axis being marked in the diagram "minor axis."

DORMAN, LONG & CO. LIMITED.

DIMENSIONS AND PROPERTIES OF I BEAMS.

For safe distributed loads see pages 46 and 47.

	Reference Mark	Size Inches	Weight per Foot lbs	DIAGRAM			
				Web t	Flange T	Radius R1	Radius R2
	BSB 30	24 x 7 1/2	100	6	1'07	7	35
	" 29	20 x 7 1/2	89	6	1'01	7	35
	" 28	18 x 7	75	55	928	65	325
	" 27	16 x 6	62	55	847	65	325
	" 26	15 x 6	59	5	88	6	3
	" 25	15 x 5	42	42	647	52	26
	" 24	14 x 6	57	5	873	6	3
	" 23	14 x 6	46	4	898	5	25
	" 22	12 x 6	54	5	883	6	3
	" 21	12 x 6	44	4	717	5	25
	DLB 20A	12 x 5	39	44	664	54	27
	BSB 20	12 x 5	32	35	55	45	225
	" 19	10 x 8	70	6	97	7	35
	" 18	10 x 6	42	4	736	5	25
	DLB 17A	10 x 5	35	42	652	52	26
	BSB 17	10 x 5	30	36	552	46	23
	" 16	9 x 7	58	55	924	65	325
	DLB 15A*	9 1/4 x 3 1/4	27.5	34	453	44	22
	BSB 15	9 x 4	21	3	46	4	2
	" 14	8 x 6	35	44	597	54	27
	" 13	8 x 5	28	35	575	45	225
	DLB 12A	8 x 4	25	38	581	48	24
	BSB 12	8 x 4	18	28	402	38	19
	" 11	7 x 4	16	25	387	35	175
	" 10	6 x 5	25	41	52	51	255
	" 9	6 x 4 1/2	20	37	431	47	235
	DLB 8A	6 x 3	16	34	484	44	22
	BSB 8	6 x 3	12	26	348	36	18
	DLB 7A*	5 x 5	24	37	551	47	235
	BSB 7	5 x 4 1/2	18	29	448	39	195
	DLB 6A	5 x 4 1/2	19	40	458	50	25
	BSB 6	5 x 3	11	22	376	32	16
	DLB 5A	4 1/4 x 1 3/4	10	32	48	32	16
	BSB 5	4 1/4 x 1 1/4	6.5	18	325	28	14
	" 4	4 x 3	9.5	22	336	32	16
	DLB 3A	4 x 1 1/4	8	3	283	3	15
	BSB 3	4 x 1 1/4	5	17	24	27	135
	" 2*	3 x 3	8.5	2	332	3	15
	DLB 1A	3 1/2 x 1 1/2	6	25	344	25	125
	BSB 1	3 x 1 1/2	4	16	246	26	13

The properties of British Standard Sections in above table are published by permission of the Engineering Standards Committee.

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DIMENSIONS AND PROPERTIES OF I BEAMS.

For safe distributed loads see pages 46 and 47.

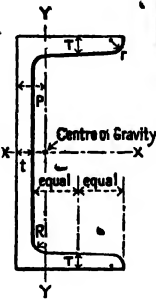
Area Square Inches	Moments of Inertia		Radii of Gyration Inches		Section Modulus About x-x	Centres of Holes c Inches	Reference Mark
	About x-x	About y-y	About x-x	About y-y			
29'4	2054	66'92	9'5	1'5	221'1	4'5	BSB 30
26'17	1670	62'63	7'99	1'54	167'0	4'5	" 29
22'06	1149	47'04	7'21	1'46	127'6	4'0	" 28
18'23	725'7	27'08	6'31	1'21	90'71	3'5	" 27
17'35	628'9	28'22	6'02	1'27	83'85	3'5	" 26
12'35	428'	11'81	5'88	1'97	57'06	2'75	" 25
16'76	562'9	27'96	5'63	1'29	78'12	3'5	" 24
13'53	440'5	21'6	5'7	1'26	62'92	3'5	" 23
15'88	375'5	28'3	4'86	1'33	62'58	3'5	" 22
12'94	315'3	22'27	4'93	1'31	52'55	3'5	" 21
11'47	260'9	12'16	4'77	1'03	43'48	2'75	DLB 20A
9'41	220'	9'753	4'83	1'01	36'66	2'75	BSB 20
20'6	344'9	71'67	4'09	1'86	68'98	4'75	" 19
12'35	211'5	22'95	4'13	1'36	42'3	3'5	" 18
10'29	167'2	11'89	4'03	1'07	33'45	2'75	DLB 17A
8'82	145'6	9'79	4'06	1'05	29'12	2'75	BSB 17
17'06	229'5	46'3	3'66	1'64	51'0	4'0	" 16
6'324	83'41	3'446	3'63	1'78	18'03	2'0	DLB 15A*
6'176	81'1	4'2	3'62	1'824	18'02	2'25	BSB 15
10'29	110'5	17'95	3'27	1'32	27'62	3'5	" 14
8'24	89'32	10'26	3'29	1'11	22'33	2'75	" 13
7'353	75'06	5'502	3'19	1'865	18'77	2'25	DLB 12A
5'294	55'69	3'578	3'24	1'822	13'92	2'25	BSB 12
4'706	39'21	3'414	2'88	1'851	11'2	2'25	" 11
7'35	43'61	9'116	2'43	1'11	14'53	2'75	" 10
5'88	34'62	5'475	2'42	1'959	11'54	2'5	" 9
4'706	26'16	1'957	2'36	1'645	8'718	1'5	DLB 8A
3'53	20'21	1'339	2'39	1'616	6'736	1'5	BSB 8
7'059	29'30	9'751	2'04	1'18	11'72	2'75	DLB 7A*
5'29	22'69	5'664	2'07	1'03	9'076	2'5	BSB 7
5'598	22'34	4'756	2'09	1'923	8'937	2'25	DLB 6A
3'235	13'61	1'462	2'05	1'672	5'444	1'5	BSB 6
2'941	9'275	1'413	1'78	1'375	3'905	..	DLB 5A
1'912	6'73	1'263	1'87	1'37	2'833	..	BSB 5
2'794	7'52	1'281	1'64	1'677	3'76	1'5	" 4
2'353	5'328	1'324	1'50	1'371	2'664	..	DLB 3A
1'47	3'668	1'186	1'58	1'355	1'834	..	BSB 3
2'5	3'787	1'262	1'23	1'71	2'524	1'5	" 2*
1'765	3'086	1'183	1'32	1'322	1'763	..	DLB 1A
1'176	1'659	1'124	1'18	1'324	1'106	..	BSB 1

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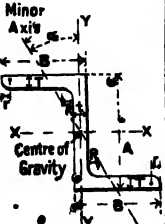
CHANNELS.

DIMENSIONS AND PROPERTIES.

	Referent Mark	Size A x B	Standard Thicknesses		Radii		Weight per foot—lbs.
			t	T	R	r	
	BS0 27	15 x 4	·525	·630	·630	·440	41·94
	" 26	12 x 4	·525	·625	·625	·425	36·47
	" 25	12 x 3½	·500	·600	·600	·425	32·88
	" 24	12 x 3½	·375	·500	·500	·350	28·10
	" 22	11 x 3½	·475	·575	·575	·400	29·82
	" 21	10 x 4	·475	·575	·575	·400	30·16
	DLO 21A*	10 x 4	·312	·312	·600	·200	18·86
	BS0 20	10 x 3½	·475	·575	·575	·400	28·21
	" 19	10 x 3½	·375	·500	·500	·350	23·55
	" 17	9 x 3½	·450	·550	·550	·375	25·39
	" 16	9 x 3½	·375	·500	·500	·350	22·27
	" 15	9 x 3	·375	·437	·437	·350	19·37
	" 13	8 x 3½	·425	·525	·525	·375	22·72
	" 12*	8 x 3	·375	·500	·500	·350	19·30
	" 10	7 x 3½	·400	·500	·500	·350	20·23
	" 9	7 x 3	·375	·475	·475	·325	17·56
	DLO 9A*	7 x 2½	·230	·325	·325	·230	9·75
	BS0 8	6 x 3½	·375	·475	·475	·325	17·9
	" 6	6 x 3	·312	·437	·437	·300	14·49
	DLO 5A	5½ x 2½	·437	·500	·500	·350	16·08
	" 4A	4½ x 2	·500	·500	·500	·350	12·92
	" 3A	4 x 3	·375	·500	·500	·350	14·20
	" 2A	2½ x 1	·312	·312	·250	·200	4·14

ZED BARS.

DIMENSIONS AND PROPERTIES.

	References Mark	Size A x B	Standard Thicknesses		Area square inches	Weight per foot— lbs.
			t	T		
	BSZ 8	10 x 3½	·475	·575	8·283	28·16
	" 7	9 x 3½	·450	·550	7·449	25·33
	" 6	8 x 3½	·425	·525	6·670	22·68
	" 5	7 x 3½	·400	·500	5·948	20·22
	" 4	6 x 3½	·375	·475	5·258	17·88
	" 3	5 x 3	·350	·450	4·169	14·17
	DLS 2A	4 x 3	·325	·425	3·605	12·26

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DORMAN, LONG & CO. LIMITED.

CHANNELS.

DIMENSIONS AND PROPERTIES.

Area square inches	Dimension " "	Moments of Inertia		Section Moduli		Radii of Gyration inches		Reference Mark
		About xx	About yy	About xx	About yy	About xx	About yy	
12'334	'935	377'0	14'55	50'27	4'748	5'53	1'09	B80 27
10'727	1'031	218'2	13'65	36'36	4'599	4'51	1'13	" 26
9'671	'867	190'7	8'922	31'79	3'889	4'44	'960	" 25
7'675	'860	158'6	7'572	26'44	2'868	4'55	'993	" 24
8'771	'896	148'6	8'421	27'02	3'234	4'12	'980	" 22
8'871	1'102	130'7	12'02	26'14	4'147	3'84	1'16	" 21
5'548	'929	82'58	7'136	16'52	2'824	3'86	1'13	DLO 21A*
8'296	'933	117'9	8'194	23'59	3'192	3'77	'994	B80 20
6'925	'933	102'6	7'187	20'52	2'800	3'85	1'02	" 19
7'469	'971	88'07	7'660	19'57	3'029	3'43	1'01	" 17
6'50	'976	79'90	6'963	17'76	2'759	3'49	1'03	" 16
5'696	'754	65'18	4'021	14'48	1'790	3'38	'840	" 15
6'682	1'011	63'76	7'067	15'04	2'439	3'09	1'03	" 13
5'675	'844	53'43	4'329	13'35	2'006	3'07	'873	" 12*
5'950	1'061	44'55	6'498	12'73	2'664	2'74	1'04	" 10
5'166	'874	37'63	4'017	10'75	1'889	2'76	'882	" 9
2'863	'547	20'48	1'069	5'852	'877	2'67	'611	DLO 9A*
5'266	1'119	29'66	5'907	9'885	2'481	2'36	1'06	B80 8
4'241	'938	24'01	3'503	8'003	1'699	2'37	'907	" 6
4'728	'922	18'13	3'385	7'075	1'733	1'96	'846	DLO 5A
3'800	'627	9'923	1'069	4'410	'779	1'62	'530	" 4A
4'175	1'081	10'15	3'432	5'076	1'783	1'56	'907	" 3A
1'218	'325	'927	'085	'742	'126	'872	'264	" 2A

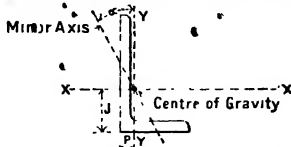
ZED BARS.

DIMENSIONS AND PROPERTIES.

Radii—inches		Moments of Inertia		Section Moduli		Angle of Degrees	Least Radius of Gyration inches	Reference Mark
R	r	About xx	About yy	About xx	About yy			
'500	'350	117'865	12'876	23'573	3'947	14	'839	B82 8
'475	'350	87'889	12'418	19'531	3'792	16½	'943	" 7
'450	'325	68'729	12'024	15'932	3'657	19½	'845	" 6
'450	'300	44'609	11'618	12'745	3'521	23	'840	" 5
'425	'300	29'660	11'134	9'887	3'361	28½	'821	" 4
'375	'250	16'145	6'578	6'458	2'328	29½	'698	" 3
'350	'225	9'093	6'317	4'546	2'226	38½	'651	DLO 2A

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UNEQUAL ANGLES.
DIMENSIONS AND PROPERTIES.

Reference Mark	Size and Thickness	Area Square Inches	Weight per Foot - Lbs	Radii		Dimensions		Moments of Inertia		Section Moduli		Angle C Degrees	Least Radius of Gyration
				Root	Toe	J	P	About XX	About YY	About XX	About YY		
BSUA 25	7 3 1/2	5.0	17.00	425	300	2.50		764	25.1	4.225	581	56.14	.74
" 25	" "	6.172	20.93	425	300	2.55		819	30.56	5.156	261	92.14	.74
" 25	" "	7.7	31.34	425	300	2.60		862	35.63	5.958	112	26.14	.73
" 24	6 1/2 4 1/2	5.5248	17.34	45	325	2.08	1.01	22.2	3.755	0.22	57.25	.97	
" 24	" "	6.643	22.04	45	325	2.15	1.14	27.0	6.606	20.5	15.25	.96	
" 24	" "	7.7	26.26	13.45	325	2.12	1.19	31.66	12.327	55.3	72.25	.96	
" 22	6 1/2 3 1/2	5.3	16.12	37	300	2.22		711	15.7	3.275	671	15.16	.75
" 22	" "	6.475	16.15	45	300	2.25		792	16.4	4.204	121	15.16	.75
" 22	" "	7.5	19.34	425	300	2.35		841	24.31	5.065	21	10.16	.74
" 21	6 4	5.3	16.12	27	300	1.91		647	17.7	1.775	231	54.73	.67
" 21	" "	6.4	16.15	15	300	1.95		674	17.1	1.94	232	02.13	.66
" 21	" "	7.5	19.34	17	300	2.02	1.02	20.8	7.36	23.2	47.25	.69	
" 20	6 3 1/2	5.544	11.64	7	275	2.02		775	13.6	5.223	161	14.19	.76
" 20	" "	6.4	15.31	40	275	2.06		823	16.4	4.144	151	55.19	.75
" 20	" "	7.5	19.34	37	275	2.11		872	19.63	4.375	111	69.13	.75
DLUA 20A	6 3	5.238	11.00	40	275	2.12		632	12.0	2.055	09	37.14	.64
" 20A	" "	6.4	15.14	15	275	2.17		683	15.5	2.624	05	13.14	.63
" 20A	" "	7.5	19.34	19	275	2.22		731	18.73	3.154	91	33.14	.63
BSUA 19	5 1/2 3 1/2	5.3	16.12	40	275	1.80		507	9.93	3.152	631	17.52	.76
" 19	" "	6.4	14.46	40	275	1.85		537	12.37	4.053	511	54.22	.75
" 19	" "	7.5	19.34	40	275	1.90		565	15.6	4.564	331	87.21	.75
" 18*	5 1/2 3	5.0	10.37	375	250	1.90		662	9.45	2.022	62	86.17	.64
" 18*	" "	6.4	13.61	375	250	1.95		711	12.2	2.583	441	13.16	.64
" 18*	" "	7.5	16.74	375	250	2.00		759	14.7	3.084	291	37.16	.63
" 17	5 4	5.236	11.00	40	275	1.51	1.01	7.96	4.532	2.1		.85	
" 17	" "	6.4	14.46	40	275	1.56	1.06	10.3	5.322	991		.84	
" 17	" "	7.5	19.34	40	275	1.60	1.11	12.4	7.015	662	43.52	.83	
" 16	5 3 1/2	5.3	16.12	375	250	1.53		343	7.6	3.052	241	17.25	.75
" 16	" "	6.4	13.61	375	250	1.64		387	9.26	3.952	331	52.25	.75
" 16	" "	7.5	16.74	375	250	1.69		441	11.9	4.753	601	36.25	.74

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UNEQUAL ANGLES.

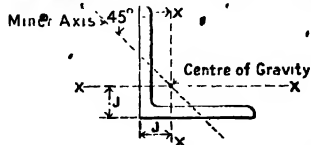
DIMENSIONS AND PROPERTIES.

Reference Mark	Size and Thickness	Area Square Inches	Weight per Foot—Lbs	Radii		Dimen- sions	Moments of Inertia		Section Moduli		Angle & Degrees	Least Radius of Gyration		
				Root	Toe		About xx	About yy	About xx	About yy				
BSUA 15	5" x 3"	2.402	8.17	350	250	1.66	667	6.14	1.63	1.34	72.20	65		
" 15	" "	2.350	8.72	350	250	1.68	693	7.24	1.97	2.13	35.19	65		
" 15	" "	2.3	749	12.75	350	250	1.73	742	9.33	2.59	2.35	11.19	64	
" 15	" "	2.4	609	15.67	350	250	1.73	733	11.25	3.00	3.49	1.36	19	6
" 14*	4" x 3"	2.402	8.17	350	250	1.46	356	4.92	2.55	1.54	97.30	74		
" 14*	" "	2.359	9.72	350	250	1.30	380	5.69	3.00	1.83	15.30	74		
" 14*	" "	2.3	749	12.75	350	250	1.14	490	7.31	3.34	3.39	5.30	74	
" 14*	" "	2.4	609	15.67	350	250	1.48	387	8.82	4.61	2.92	1.83	30	74
" 12	4" x 3"	2.246	7.64	350	250	1.16	915	3.46	2.47	1.22	96.57	72		
" 12	" "	2.2	671	9.03	350	250	1.19	941	4.03	3.00	1.43	13.37	72	
" 12	" "	2.3	480	11.90	350	250	1.24	330	5.33	3.71	1.39	42.37	71	
" 12	" "	2.4	285	14.61	350	250	1.23	1.04	6.23	4.44	2.51	80.36	71	
" 11	4" x 3"	2.2	681	7.11	325	225	1.24	716	3.51	1.59	1.20	71.23	64	
" 11	" "	2.3	3.48	1.25	225	1.27	771	3.39	1.37	1.47	34.23	64		
" 11	" "	2.3	511	10.32	325	225	1.31	819	4.38	2.37	1.35	10.23	63	
" 11	" "	2.3	335	13.35	325	225	1.31	365	5.36	2.83	2.26	33.22	63	
" 9	3" x 3"	2.1	934	5.33	325	225	1.04	732	2.27	1.53	92	69.35	62	
" 9	" "	2.2	3.31	1.35	225	1.06	819	2.67	1.80	1.10	33.55	62		
" 9	" "	2.0	101	10.3	325	225	1.11	3.5	4.40	2.33	1.42	107.35	61	
" 9	" "	2.0	671	4.3	325	225	1.16	91	4.08	2.71	1.73	30.35	61	
" 8	3" x 2"	2.1	779	6.03	300	200	1.12	627	3.15	1.90	90	49.26	54	
" 8	" "	2.1	113	7.13	300	200	1.15	632	3.22	1.06	1.07	57.25	53	
" 8	" "	2.2	732	1.79	300	200	1.20	639	3.29	1.34	1.39	74.25	53	
" 7	3" x 2"	2.1	512	4.46	275	200	0.86	642	1.14	1.76	54	39.34	52	
" 7	" "	2.1	921	6.53	275	200	0.85	637	1.62	1.02	79	57.34	52	
" 7	" "	2.2	1.49	5.33	275	200	0.90	744	2.05	1.23	1.02	73.33	52	
" 6	3" x 2"	2.1	135	4.64	275	200	0.976	482	1.05	1.373	53	25.23	43	
" 6	" "	2.1	733	5.19	275	200	1.03	532	1.50	525	76	36.23	42	
" 6	" "	2.2	1.49	7.65	275	200	1.07	578	1.89	636	33	46.22	42	
" 5	3" x 2"	2.1	1065	3.61	250	175	0.774	527	0.36	330	37	24.32	42	
" 5	" "	2.1	1.309	4.15	250	175	0.79	552	0.770	433	45	30.51	42	
" 5	" "	2.1	547	5.26	250	175	0.83	575	0.895	502	53	35.31	42	
" 4	2" x 1"	1.6	622	2.11	225	150	0.627	331	0.740	115	17	10.23	32	
" 4	" "	1.6	617	2.77	225	150	0.655	407	3.08	146	23	13.28	31	
" 4	" "	1.6	937	3.39	225	150	0.678	431	3.69	174	28	16.28	31	

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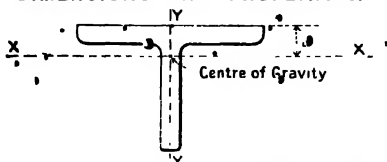
EQUAL ANGLES.

DIMENSIONS AND PROPERTIES.



Reference Mark	Size and Thickness	Area Square Inches	Weight per Foot Lbs	Radii		Dimension J	Moment of Inertia xx	Section Mod'us xx	Least Radius of Gyrt'n
				Root	Toe				
BSEA 16*	8 x 8 x 1/2	7.75	26.35	.600	.425	2.15	47.4	8.10	1.58
" 16*	" " " 1/2	9.609	32.67	.600	.475	2.20	52.2	10.03	1.57
" 16*	" " " 1/2	11.437	39.39	.600	.425	2.25	63.5	11.91	1.56
" 14	6 x 6 x 1/2	5.062	17.21	.475	.325	1.64	17.3	3.97	1.18
" 14	" " " 1/2	7.112	24.18	.475	.325	1.71	23.8	5.55	1.18
" 14	" " " 1/2	8.441	29.00	.475	.325	1.76	27.8	6.56	1.17
" 13	5 x 5 x 1/2	3.610	12.27	.425	.300	1.37	8.51	2.34	.98
" 13	" " " 1/2	4.750	16.15	.425	.300	1.42	11.0	3.07	.98
" 13	" " " 1/2	5.860	19.92	.425	.300	1.47	13.4	3.80	.98
" 12*	4 x 4 x 1/2	3.236	11.00	.400	.275	1.22	6.14	1.87	.88
" 12*	" " " 1/2	4.252	14.46	.400	.275	1.29	7.92	2.47	.87
" 12*	" " " 1/2	5.236	17.80	.400	.275	1.34	9.56	3.03	.87
" 11	4 x 4 x 1/2	2.859	9.72	.350	.250	1.12	4.26	1.48	.78
" 11	" " " 1/2	3.749	12.75	.350	.250	1.17	5.46	1.93	.77
" 11	" " " 1/2	4.609	15.67	.350	.250	1.22	6.56	2.36	.77
" 10	3 1/2 x 3 1/2 x 1/2	2.091	7.11	.325	.225	1.09	2.39	.95	.68
" 10	" " " 1/2	2.485	8.45	.325	.225	1.00	2.80	1.12	.68
" 10	" " " 1/2	3.251	11.05	.325	.225	1.05	3.57	1.46	.68
" 10	" " " 1/2	3.985	13.55	.325	.225	1.09	4.27	1.77	.68
" 9	3 x 3 x 1/4	1.44	4.90	.300	.200	.827	1.21	.56	.59
" 9	" " " 1/4	2.111	7.18	.300	.200	.877	1.72	.81	.53
" 9	" " " 1/4	2.752	9.36	.300	.200	.924	2.19	1.05	.53
" 9	" " " 1/4	3.362	11.45	.300	.200	.970	2.59	1.28	.53
" 7	2 1/2 x 2 1/2 x 1/4	1.187	4.04	.275	.200	.703	.677	.38	.48
" 7	" " " 1/4	1.464	4.98	.275	.200	.720	.822	.46	.48
" 7	" " " 1/4	1.733	5.89	.275	.200	.752	.965	.55	.48
" 7	" " " 1/4	2.249	7.65	.275	.200	.799	1.21	.71	.48
" 6	2 1/4 x 2 1/4 x 1/8	.809	2.75	.255	.175	.616	.378	.23	.44
" 6	" " " 1/8	1.063	3.61	.255	.175	.643	.489	.30	.44
" 6	" " " 1/8	1.309	4.45	.255	.175	.668	.592	.37	.43
" 6	" " " 1/8	1.547	5.26	.255	.175	.692	.685	.44	.43
" 5	2 x 2 x 1/8	.715	2.43	.250	.175	.554	.260	.18	.39
" 5	" " " 1/8	.938	3.19	.250	.175	.581	.336	.24	.39
" 5	" " " 1/8	1.153	3.92	.250	.175	.605	.401	.29	.38
" 5	" " " 1/8	1.36	4.62	.250	.175	.629	.467	.34	.38
" 4	1 3/4 x 1 3/4 x 1/8	.622	2.11	.225	.150	.495	.173	.14	.34
" 4	" " " 1/8	.814	2.77	.225	.150	.520	.220	.18	.34
" 4	" " " 1/8	.997	3.39	.225	.150	.541	.264	.22	.34
" 3	1 1/2 x 1 1/2 x 1/8	.526	1.79	.200	.150	.454	.105	.10	.29
" 3	" " " 1/8	.686	2.33	.200	.150	.458	.134	.13	.29
" 3	" " " 1/8	.839	2.85	.200	.150	.482	.153	.16	.29
" 2	1 1/4 x 1 1/4 x 1/8	.433	1.47	.200	.150	.371	.058	.07	.24
" 2	" " " 1/8	.561	1.91	.200	.150	.336	.073	.09	.23

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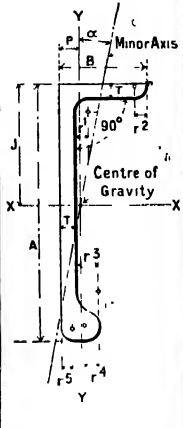
TEES.
DIMENSIONS AND PROPERTIES.

Reference Mark	Size and Thickness	Area Square Inches	Weight per foot—lbs.	Radii		Dimension	Moments of Inertia		Section Moduli		Radii of Gyration	
				Table Root	Table Toe		About xx	About yy	About xx	About yy	About xx	About yy
BST 21	6 × 4 × 3/8	3.634	12.36	.425	.300	.915	4.700	6.344	1.52	2.11	1.137	1.321
" 21	" " " 3/8	4.771	16.22	.425	.300	.963	6.070	8.212	2.00	2.67	1.281	1.344
" 31	" " " 1/2	5.878	19.90	.425	.300	1.02	7.350	10.912	2.47	3.64	1.118	1.362
" 20	6 × 3 × 3/8	3.260	11.08	.400	.275	.633	2.062	6.389	.87	2.13	.795	1.400
" 20	" " " 1/2	4.272	14.55	.400	.275	.684	2.635	8.649	1.14	2.88	.785	1.423
" 20	" " " 3/4	5.256	17.87	.400	.275	.732	3.144	10.938	1.39	3.65	.773	1.443
" 19	5 × 4 × 3/8	3.257	11.07	.400	.275	.998	4.471	3.691	1.49	1.48	1.172	1.065
" 19	" " " 1/2	4.268	14.51	.400	.275	1.05	5.772	5.017	1.96	2.01	1.163	1.084
" 17	5 × 3 × 3/8	2.875	9.73	.350	.250	.691	1.973	3.726	.85	1.49	.823	1.137
" 17	" " " 1/2	3.782	12.79	.350	.250	.741	2.516	5.031	1.12	2.01	.818	1.156
" 15	4 × 3 × 3/8	2.872	9.77	.350	.250	1.1	4.139	1.901	1.45	.95	1.208	.814
" 15	" " " 1/2	3.755	12.78	.350	.250	1.16	5.402	2.590	1.90	2.21	.199	.830
" 14	4 × 3 × 3/4	2.45	8.49	.325	.225	.767	1.860	1.914	.83	.96	.863	.875
" 14	" " " 1/2	3.272	11.33	.325	.225	.816	2.365	2.599	1.08	1.30	.851	.893
" 13	3 1/2 × 3 1/2 × 3/8	2.496	8.49	.325	.225	.988	2.768	1.284	1.10	.73	1.053	.717
" 13	" " " 1/2	3.257	11.03	.325	.225	1.04	3.543	1.752	1.44	1.00	1.043	.733
" 11	3 × 3 × 3/8	2.121	7.24	.300	.200	.863	1.708	.816	.80	.54	.897	.620
" 11	" " " 1/2	2.76	9.53	.300	.200	.918	2.165	1.115	1.04	.74	.886	.636
" 10	3 × 2 1/2 × 3/8	1.929	6.56	.275	.175	.635	1.015	.814	.56	.54	.725	.650
" 10	" " " 1/2	2.506	8.52	.275	.175	.742	1.275	1.109	.73	.74	.713	.665
" 8	2 1/2 × 2 1/2 × 3/8	1.197	4.07	.275	.200	.697	.677	.302	.33	.24	.752	.502
" 8	" " " 1/2	1.474	5.01	.275	.200	.724	.823	.327	.46	.31	.747	.512
" 8	" " " 3/4	1.742	5.92	.275	.200	.750	.959	.473	.55	.38	.742	.521
" 7	2 1/4 × 2 1/4 × 3/8	1.071	3.64	.250	.175	.638	.488	.224	.30	.20	.675	.457
" 7	" " " 1/2	1.554	5.23	.250	.175	.689	.625	.349	.44	.31	.664	.474
" 6	2 × 2 × 3/8	.947	3.22	.250	.175	.579	.337	.157	.24	.16	.597	.407
" 6	" " " 1/2	1.367	4.64	.250	.175	.622	.469	.246	.34	.25	.586	.424
DLT 6A	2 × 1 1/2 × 3/8	.820	2.79	.225	.150	.403	.148	.159	.14	.16	.425	.441
" 6A	" " " 1/2	1.180	4.01	.225	.150	.455	.202	.246	.19	.25	.414	.457
BST 5	1 1/2 × 2 × 3/8	.820	2.79	.225	.150	.648	.307	.068	.23	.09	.612	.788
" 5	" " " 1/2	1.003	3.41	.225	.150	.674	.369	.088	.28	.12	.607	.796
" 4	1 1/4 × 1 3/4 × 3/8	.820	2.79	.225	.150	.519	.221	.107	.18	.12	.520	.531
" 4	" " " 1/2	.998	3.40	.225	.150	.544	.265	.137	.22	.16	.515	.576
" 3	1 1/2 × 1 1/2 × 3/8	.531	1.81	.200	.150	.435	.106	.048	.10	.06	.441	.401
" 3	" " " 1/2	.725	2.35	.200	.150	.460	.135	.067	.13	.09	.442	.512

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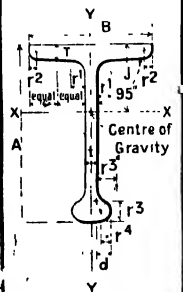
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BULB ANGLES. **DIMENSIONS AND PROPERTIES.**

	Reference Mark	Size A x B	Standard Thickness t	Area square inches	Weight per foot—lbs.	Radii	
						r ¹	r ²
	BSBA 20	12 x 4	•600	10 724	36 46	•675	•450
	" 19	11 x 3½	•550	8 353	30 44	•625	•425
	" 18	10 x 3½	•525	7 904	26 27	•575	•400
	" 17	9½ x 3½	•500	7 277	24 74	•550	•375
	" 16	9 x 3½	•475	6 677	22 70	•550	•350
	" 14	8½ x 3½	•475	6 539	21 55	•525	•350
	" 12	8 x 3½	•450	5 779	19 65	•500	•325
	" 11	8 x 3	•425	5 301	18 02	•500	•325
	" 9	7½ x 3	•425	5 023	17 08	•475	•325
	" 8	7 x 3½	•425	4 940	16 80	•450	•300
	" 7	7 x 3	•400	4 481	15 29	•450	•300
	" 6	6½ x 3½	•400	4 420	15 05	•425	•275
	" 5	6½ x 3	•375	4 072	13 61	•425	•275
	" 4	6 x 3	•375	3 763	12 79	•400	•275
	" 3	5½ x 3	•350	3 332	11 35	•375	•250

BULB TEES.

DIMENSIONS AND PROPERTIES.

	Reference Mark	Size A x B	Standard Thickness		Area square inches	Weight per foot—lbs.	Radii	
			t	τ			r ¹	r ²
	BSBT G*	12 x 6½	•575	•650	12 498	42 49	•975	•325
	" 5*	11 x 6½	•550	•600	11 136	37 86	•900	•300
	" 4*	10 x 6	•500	•550	9 295	31 60	•825	•275
	" 3*	9 x 5½	•475	•500	7 870	26 75	•750	•250
	" 2*	8 x 5½	•450	•450	6 701	22 78	•675	•225
	" 1*	7 x 5	•425	•425	5 592	19 01	•600	•200
	DLBT 1A	2½ x 2½	•3125	•3125	3 759	5 36	•26	•14
	" 1B	2 x 2	•2	•2	•941	3 20	•2	•1

The properties of British Standard Sections in above tables, where taken from the Engineering Standards Committee's Section Book, are published by permission of the Committee.

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BULB ANGLES.

DIMENSIONS AND PROPERTIES.

Radii			Centre of Gravity		Moments of Inertia		Section Moduli		Angle of Degrees	Least Radius of Gyration of Inches	Reference Mark
r'	r	r''	J	P	About xx	About yy	About xx	About yy			
1 125	675	350	5 555	778	191 445	8 355	29 845	2 583	4 1/2	821	BSBA 20
1 050	625	325	5 177	686	155 856	5 170	23 031	1 837	4	715	" 19
975	575	300	4 622	693	98 228	4 823	18 265	1 720	5	724	" 18
950	550	275	4 361	694	82 415	4 525	16 039	1 634	5 1/2	729	" 17
900	500	250	4 005	695	63 383	4 336	15 141	1 546	6	735	" 16
850	525	225	3 798	706	57 775	4 265	12 277	1 526	6 1/2	740	" 14
825	500	200	3 543	712	47 972	4 031	10 561	1 446	8	746	" 12
825	500	200	3 543	600	42 265	2 449	9 911	1 020	9	627	" 11
800	475	175	3 419	612	35 725	2 405	8 754	1 007	6	632	" 9
750	450	150	2 983	737	30 914	3 730	7 725	1 350	10	758	" 8
750	450	150	3 141	614	22 065	2 280	7 272	943	7	638	" 7
700	425	125	2 723	747	23 943	3 494	6 339	1 269	11 1/2	764	" 6
700	425	125	2 723	619	21 677	2 008	5 965	881	8 1/2	644	" 5
675	400	100	2 597	677	17 350	2 057	5 008	871	10	643	" 4
650	375	75	2 346	649	13 032	1 909	4 132	812	11 1/2	655	" 3

BULB TEES.

DIMENSIONS AND PROPERTIES.

Radii		Dimension d	Centre of Gravity J	Moments of Inertia		Section Moduli		Radii of Gyration of Inches		Reference Mark
r'	r			About xx	About yy	About xx	About yy	About xx	About yy	
1 30	475	725	4 759	256 808	13 965	32 704	4 297	4 355	1 057	BSBT 6*
1 20	450	675	4 290	177 041	12 400	26 324	3 505	3 983	1 067	" 5*
1 10	400	625	3 881	122 278	9 124	19 584	3 041	3 627	992	" 4*
1 00	375	575	3 524	83 730	6 410	15 230	2 351	3 262	902	" 3*
90	325	500	3 018	55 377	5 628	11 115	2 046	2 875	916	" 2*
80	300	450	2 611	35 087	4 021	7 994	1 608	2 505	848	" 1*
3	2	344	977	1 392	403	914	322	890	479	LBST 1A
26	16	25	739	493	127	407	127	724	367	" 1B

The properties of British Standard Sections in above tables, where taken from the Engineering Standards Committee's Section Book, are published by permission of the Committee.

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NOTES ON I BEAMS AND COMPOUNDS.

Dimensions and Properties.—The dimensions and properties of I beams will be found on pages 34 and 35.

The dimensions and properties of compounds are given on the pages immediately preceding those containing the tabular loads for each type. The moment of inertia and section modulus have been calculated on the net section, that is both flanges holed for rivets, the size allowed in any particular case, being shown in the several tables.

Weight of Compounds.—The published weights per foot of compounds are inclusive of rivets. The pitch of rivets for spans in general demand has been taken as the basis of calculation in all cases.

Tabular Loads. The loads given in the tables include the weights of the girders themselves, and are based on an extreme fibre stress of 7.5 tons per square inch, being one-fourth of the average breaking stress. They are also calculated on the assumption that the girders receive the usual side support as in building work. For other cases, such as concentrated, eccentric, or live loads, special calculation is necessary.

The resistance of the web to shear or buckling has been taken as the limiting factor in deciding the maximum load for each section. These loads should not be exceeded when sections are used at less spans than those for which such values are given.

Deflection.—Care should be taken in selecting beams and compounds that the deflection is not too great for the purpose for which they are to be employed. The zig-zag lines in the tables indicate the generally accepted limit of span to depth (20 to 1) for girders supporting plastered ceilings at full tabular loads.

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Deflection Co-efficient.—For I beams and compounds of uniform section throughout their lengths, the deflection, in inches, for tabular loads is found by multiplying the square of the span, in feet, by the co-efficient which is given for each section. If the actual load is less than the tabular load, the deflection will be less in exactly the same proportion.

Selection of I Beams and Compounds.—It will be observed that, in the tables of distributed loads of beams, the relative order of the British Standard Sections has been maintained; but in each compound table the girders are arranged in the order of their carrying capacity.

It will be further noted that, in most cases, several compounds of different depths and widths will meet the requirements as to loading. It should, however, be borne in mind that, where the depth is not restricted, a deeper and frequently a lighter section, carrying even a greater load than that required, may often be found more economical.

The table, in any case, affords a ready means of selection.

Riveting of Compounds.—In the tables of compounds, particulars are given of the diameter of rivets for each section, together with the minimum spans, at, and above, which the various pitches may be used. In cases of shorter spans than those for which loads are given, special calculations are necessary.

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I BEAMS.



SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see pages 34 and 35.

Size Inches	Weight per foot lbs.	SPANS IN FEET								
		2	4	6	8	10	12	14	16	18
24 x 7 1/2	100					102	92	79	69	61
20 x 7 1/2	89				94	83	69	59	52	46
18 x 7	75				78	64	53	45	40	35
16 x 6	62			73	56	45	38	32	28	25
15 x 6	59			62	52	42	35	30	26	23
15 x 5	42			47	35	28	24	20	18	16
14 x 6	57			59	47	38	31	27	24	21
14 x 6	46			43	39	31	25	22	19	17
12 x 6	54		53	42	39	31	23	22	19	17
12 x 6	44			40	33	26	22	19	16	14
12 x 5	39		45	36	27	22	18	15	13	12
12 x 5	32		32	30	23	18	15	13	11	10
10 x 8	70			53	43		28	24	21	19
10 x 6	42			35	26	21	17	15	13	11
10 x 5	35		37	23	2	17	11	12	10	9.3
10 x 5	30		30	24	18	14	12	10	9	8
9 x 7	58		41	42	32	25	21	18	16	14
9 x 4 1/2	21.5	26	22	15	11		7.5	6.4	5.6	5.0
9 x 4	21		22	15	11		7.5	6.4	5.6	5
8 x 6	35		31	23	17	14	11	9.8	8.6	7.7
8 x 5	28		25	18	14	11	9	8	7	6.2
8 x 4	25	27	23	16	12	9.4	7.8	6.7	5.9	5.2
8 x 4	18	19	17	11	8.7	7	5.8	5	4.3	3.8
7 x 4	16	15	14	9.4	7	5.6	4.7	4	3.5	3.1
6 x 5	25	22	18	12	9	7.3	6	5.2	4.5	4
6 x 4 1/2	20	20	14	9.6	7.2	5.8	4.8	4.1	3.6	3.2
6 x 3	16	18	11	7.3	5.4	4.4	3.6	3.1	2.7	2.4
6 x 3	12	14	8.4	5.6	4.2	3.4	2.8	2.4	2.1	1.9
* 5 x 5	24		15	9.8	7.3	5.9	4.9	4.2	3.7	...
5 x 4 1/2	18	13	11.3	7.6	5.6	4.5	3.8	3.2	2.8	...
5 x 4 1/2	19	18	11	7.4	5.6	4.5	3.7	3.2	2.8	...
5 x 3	11		9.8	6.8	4.5	3.4	2.7	2.3	1.9	1.7
4 1/2 x 1 1/2	10		4.9	3.3	2.4	2.0	1.6	1.4	...	...
4 1/2 x 1 1/2	6.5	7	3.5	2.4	1.8	1.4	1.2	1	...	...
4 x 3	9.5	7.8	4.7	3.1	2.3	1.9	1.6	1.3	...	...
4 x 1 1/2	8	6.6	3.3	2.2	1.6	1.3	1.1	.95	...	...
4 x 1 1/2	5	4.6	2.3	1.5	1.1	.91	.76	.65
* 3 x 3	8.5	5.3	3.2	2	1.6	1.2	1	.9
3 1/2 x 1 1/2	6	4.4	2.2	1.5	1.1	.88	.73	.63
3 x 1 1/2	4	2.8	1.4	.92	.6	.55	.46	.39

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I BEAMS

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.

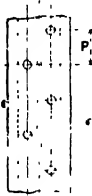
For dimensions and properties of sections see pages 34 and 35.

SPANS IN FEET										Deflection Coefficient	Weight per foot lbs.	Sae Inches
20	22	24	26	28	30	32	36	40				
55	50	46	42	39	36	34	30	27		00078	100	24 × 7½
41	38	34	32	29	27	26	23	20		000937	89	20 × 7½
32	29	26	24	22	21	20	17			00104	75	18 × 7
22	20	19	17	16	15	14	12			00117	62	16 × 6
21	19	17	16	15	14	13	11			00125	59	15 × 6
14	13	12	11	10	9.5	9				00125	42	15 × 5
19	17	16	14	13	12					00125	57	14 × 6
15	14	13	12	11	10					00133	46	14 × 6
15	14	13	12	11	10					00156	54	12 × 6
13	12	11	10	9						00156	44	12 × 6
11	9.9	9.0	8.3	7.7	7.2					001562	39	12 × 5
9	8.3	7.6	7	6.5						00156	32	12 × 5
17	15	14	13							001875	70	10 × 8
10	9.6	8.8	8							001875	42	10 × 6
8.4	7.6	7.0	6							001875	35	10 × 5
7.2	6.6	6	5.6							001875	30	10 × 5
12	11	10	9.3							00208	58	9 × 7
4.5	4.1	3.7	3.5							002027	21.5	9½ × 3½*
4.5	4	3.7								00208	21	9 × 4
7	6.3									00234	35	8 × 6
5.5	5									00234	28	8 × 5
4.7	4.2									002344	25	8 × 4
3.5	3.2									00234	18	8 × 4
2.8	2.5									00268	16	7 × 4
										003125	25	6 × 5
										003125	20	6 × 4½
										003125	16	6 × 3
										003125	12	6 × 3
										00375	24	5 × 5*
										00375	18	5 × 4½
										00375	12	5 × 4½
										00375	11	5 × 3
										00395	10	4½ × 1½
										00395	6.5	4½ × 1½
										00469	9.5	4 × 3
										00469	8	4 × 1½
										00469	5	4 × 1½
										00625	8.5	3 × 3*
										005357	6	3½ × 1½
										00625	4	3 × 1½

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DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.



Reference Mark		COMPOSED OF				Dimensions in inches		
		Beams		Plats		Depth	Width	
				No.	Size			
BO	1	24	7 1/2	100	4	12	26 1/2	12
"	2	20	7 1/2	89	4	12	22 1/2	12
"	3	24	7 1/2	100	2	12	25 1/2	12
"	4	18	7	75	4	12	20 1/2	12
"	5	18	7	75	4	10	20 1/2	10
"	6	20	7 1/2	89	2	12	21 1/2	12
"	7	16	6	62	4	10	18 1/2	10
"	8	15	6	59	4	10	17 1/2	10
"	9	18	7	75	2	12	19 1/2	12
"	10	16	6	62	4	10	18	10
"	11	18	7	75	2	10	19	10
"	12	15	6	59	4	10	17	10
"	13	14	6	57	4	9	16 1/2	9
"	14	14	6	57	4	9	16	9
"	15	12	6	54	4	9	14 1/2	9
"	16	16	6	62	2	10	17 1/2	10
"	17	16	6	62	2	9	17 1/2	9
"	18	12	6	54	4	9	14	9
"	19	10	6	42	4	9	12 1/2	9
"	20	15	5	42	2	9	16 1/2	9
"	21	14	6	46	2	9	15 1/2	9
"	22	10	6	42	4	9	12	9
"	23	15	5	42	2	9	16	9
"	24	14	6	46	2	9	15	9
"	25	12	6	44	2	9	13 1/2	9
"	26	12	6	44	2	9	13	9
"	27	10	6	42	2	9	11 1/2	9
"	28	10	6	42	2	9	11	9

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION				Dia- meter of Rivets inches	Minimum Spans in feet for Pitchs (P)			Refer- ence Mark
Area sq inches	Weight per Foot—lbs.	Moment of Inertia	Section Modulus		3"	4"	6"	
59.40	205	6811	514.0	7/8	24	30		B 0 1
56.17	195	4632	411.7	7/8	20	30		" 2
44.40	153	4495	356.0	7/8		16	24	" 3
52.06	181	3592	350.4	7/8	24	30		" 4
57.06	183	3128	305.1	7/8	18	26		" 5
41.17	142	2976	280.1	7/8		14	24	" 6
43.25	151	2326	251.4	7/8	16	26		" 7
42.35	148	2049	234.1	7/8	18	26		" 8
37.06	129	2225	231.1	7/8		14	24	" 9
38.23	133	1916	216.4	7/8	14	20		" 10
35.56	119.5	2908	203.6	7/8		12	20	" 11
37.35	130	1711	201.2	7/8	16	20		" 12
37.28	130.5	1640	198.7	7/8	16	22		" 13
34.76	121.5	1373	171.6	7/8	14	20		" 14
38.38	137	1234	170.2	7/8	20	30		" 15
30.73	107.5	1420	164.6	7/8		10	20	" 16
29.48	102.5	1304	154.6	7/8		10	18	" 17
33.88	118	1026	146.6	7/8	16	26		" 18
34.85	121	858	134.0	7/8	18	24		" 19
23.60	82.5	999	123.0	7/8		12	22	" 20
24.78	86.5	924	121.1	7/8		14	18	" 21
30.35	106	684	114.0	7/8	16	20		" 22
21.35	74	866	108.3	7/8		10	18	" 23
22.53	78.5	809	107.8	7/8		12	14	" 24
24.19	84.5	688	103.8	7/8		12	22	" 25
21.94	76.5	600	92.2	7/8		10	18	" 26
23.60	82.5	476	84.6	7/8		12	22	" 27
21.35	74.5	413	75.0	7/8		10	18	" 28

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COMPOUND GIRDERS.

SAFE LOAD IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages

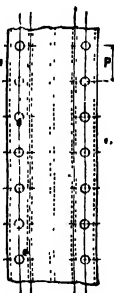
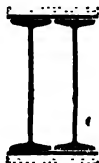
Reference Mark	SPANS IN FEET											
	8	10	12	14	16	18	20	22	24	26	28	30
1									102	99	92	86
2								94	86	79	74	69
3					102	99	89	81	74	69	64	59
4								78	73	67	62	58
5						78	76	69	64	59	55	51
6				94	88	78	70	64	58	54	50	47
7					73	70	63	57	52	48	45	42
8						62	59	53	49	45	42	39
9				78	72	64	58	52	48	44	41	38
10				73	68	60	54	49	45	42	39	36
11			78	75	65	58	52	47	43	40	37	35
12					62	56	50	46	42	39	36	33
13					59	55	50	45	41	38	35	33
14				59	54	48	43	39	36	33	31	29
15							42	38	35	32	30	28
16		73	69	59	51	46	41	37	34	31	29	27
17		73	64	55	48	43	39	35	32	30	28	26
18					46	41	37	33	30	28	26	
19						35	34	31	28	26		
20			47	44	36	34	31	28	26	24	22	20
21				43	38	34	30	27	25	23	21	20
22					35	32	29	26	24			
23		47	45	39	34	30	27	25	23	21	19	18
24			43	39	34	30	27	25	23	21	19	18
25			40	37	32	29	26	24	22	20		
26		40	38	33	29	26	23	21	19	18		
27			35	30	26	23	21	19	18			
28		35	31	27	23	21	19	17				

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.

Reference Mark	COMPOSED OF			Centres of Beams inches	Dimensions in inches	
	Beams	Flats			Depth	Width
		No.	Size			
B0 29	24 × 7½ × 100	6	18 × ¾	9	27¾	18
" 30	24 × 7½ × 100	6	16 × ¾	8	27¾	16
" 31	20 × 7½ × 89	6	18 × ¾	9	23¾	18
" 32	24 × 7½ × 100	4	18 × ¾	9	26½	18
" 33	20 × 7½ × 89	6	16 × ¾	8	23¾	16
" 34	24 × 7½ × 100	4	16 × ¾	8	26½	16
" 35	18 × 7 × 75	6	18 × ¾	9	21⅝	18
" 36	20 × 7½ × 89	4	18 × ¾	9	22½	18
" 37	20 × 7½ × 89	4	16 × ¾	8	22½	16
" 38	24 × 7½ × 100	2	18 × ¾	9	25⅛	18
" 39	24 × 7½ × 100	2	16 × ¾	8	25⅛	16
" 40	18 × 7 × 75	4	18 × ¾	9	20½	18
" 41	18 × 7 × 75	4	16 × ¾	8	20½	16
" 42	20 × 7½ × 89	2	16 × ¾	9	21¼	18
" 43	16 × 6 × 62	6	16 × ½	8	19	16
" 44	20 × 7½ × 89	2	16 × ¾	8	21¼	16
" 45	15 × 6 × 59	6	16 × ½	8	18	16
" 46	16 × 6 × 62	6	14 × ½	7	19	14
" 47	16 × 6 × 62	4	18 × ½	8	18½	16
" 48	16 × 6 × 62	6	13 × ½	6½	19	13
" 49	18 × 7 × 75	2	18 × ¾	9	19½	18
" 50	16 × 6 × 62	4	14 × ¾	7	18½	14
" 51	18 × 7 × 75	2	16 × ¾	8	19¼	16
" 52	16 × 6 × 62	4	14 × ½	7	18	14
" 53	14 × 6 × 46	4	14 × ¾	7	16½	14
" 54	14 × 6 × 46	4	13 × ¾	6½	16½	13
" 55	16 × 6 × 62	2	16 × ¾	8	17½	16
" 56	16 × 6 × 62	2	14 × ¾	7	17¼	14
" 57	14 × 6 × 46	1	14 × ½	7	16	14
" 58	16 × 6 × 62	2	13 × ¾	6½	17¼	13
" 59	15 × 5 × 42	4	12 × ½	6	17	12
" 60	15 × 5 × 42	2	14 × ¾	7	16¾	14
" 61	14 × 6 × 46	2	14 × ¾	7	15¼	14
" 62	12 × 5 × 32	4	13 × ½	6½	14	13
" 63	14 × 6 × 46	2	13 × ½	6½	15	13
" 64	15 × 5 × 42	2	12 × ½	6	16	12
" 65	10 × 5 × 30	4	13 × ½	6½	12	13
" 66	10 × 5 × 30	4	12 × ½	6	12	12
" 67	12 × 5 × 32	2	13 × ¾	6½	13¼	13
" 68	12 × 5 × 32	2	12 × ½	6	13	12
" 69	10 × 5 × 30	2	13 × ½	6½	11	13
" 70	10 × 5 × 30	2	12 × ½	6	11	12



DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION				Dia- meter of Rivets inch	Minimum Spans in feet for Pitches (P)			Refer- ence Mark
Area sq. inches	Weight per foot—lbs.	Moment of Inertia	Section Modulus		3"	4"	6"	
126'30	435'5	14941	1076'8	$\frac{7}{8}$	..	26	..	B029
118'80	410	13684	988'2	$\frac{7}{8}$	..	24	..	" 30
119'84	413'5	10267	864'6	$\frac{7}{8}$	22	28	..	" 31
103'80	357	11229	847'5	$\frac{7}{8}$	..	20	32	" 32
112'34	388	9367	788'8	$\frac{7}{8}$	20	26	..	" 33
98'80	340	10432	787'3	$\frac{7}{8}$	..	18	30	" 34
111'62	385'5	8045	739'7	$\frac{7}{8}$	22	28	..	" 35
97'34	337	7568	672'7	$\frac{7}{8}$	16	22	32	" 36
92'34	320	7003	622'4	$\frac{7}{8}$	16	20	30	" 37
81'30	280'5	7853	622'0	$\frac{7}{8}$	..	14	16	" 38
78'80	272	7473	591'9	$\frac{7}{8}$	..	14	16	" 39
89'12	309	5792	565'0	$\frac{7}{8}$	18	22	32	" 40
84'12	292	5327	519'7	$\frac{7}{8}$	16	20	30	" 41
74'84	258'5	5153	485'0	$\frac{7}{8}$	..	12	18	" 42
84'46	293'5	4528	476'6	$\frac{7}{8}$	16	22	..	" 43
72'34	250	4888	460'0	$\frac{7}{8}$	..	12	16	" 44
82'70	287	3992	443'6	$\frac{7}{8}$	16	22	..	" 45
78'46	273	4068	428'2	$\frac{7}{8}$	14	20	..	" 46
76'46	266	3907	422'3	$\frac{7}{8}$	14	20	30	" 47
75'46	265	3837	403'9	$\frac{7}{8}$	7	10	14	" 48
66'62	230'5	3798	394'6	$\frac{7}{8}$	..	12	18	" 49
71'46	249'5	3534	382'0	$\frac{7}{8}$	12	18	24	" 50
64'12	222	3582	372'1	$\frac{7}{8}$	..	10	16	" 51
64'46	227'5	3028	336'4	$\frac{7}{8}$	8	10	16	" 52
62'06	217	2537	307'5	$\frac{7}{8}$	..	16	24	" 53
59'56	211	2361	289'8	$\frac{7}{8}$	9	12	18	" 54
56'46	196	2494	289'1	$\frac{7}{8}$	..	8	16	" 55
58'96	187'5	2321	269'0	$\frac{7}{8}$	..	8	14	" 56
55'06	191'5	2136	267'0	$\frac{7}{8}$	..	14	20	" 57
52'71	187'5	2234	259'0	$\frac{7}{8}$	9	12	18	" 58
48'70	169'5	2079	244'6	$\frac{3}{4}$	12	18	22	" 59
42'20	146	1694	208'4	$\frac{3}{4}$	..	10	18	" 60
44'56	155'5	1580	207'2	$\frac{7}{8}$	..	12	14	" 61
44'82	157'5	1346	192'3	$\frac{3}{4}$	10	13	19	" 62
40'06	144'5	1354	180'5	$\frac{7}{8}$	7	10	14	" 63
36'70	127'5	1372	171'5	$\frac{3}{4}$	..	8	14	" 64
43'64	153'5	943	157'1	$\frac{3}{4}$	10	13	19	" 65
41'64	145'5	882	147'0	$\frac{3}{4}$	12	18	22	" 66
35'07	124'5	949	143'3	$\frac{3}{4}$	12	16	24	" 67
30'82	107'5	738	121'2	$\frac{3}{4}$	..	8	14	" 68
30'64	108	566	102'8	$\frac{3}{4}$	10	13	19	" 69
29'64	105	538	97'8	$\frac{3}{4}$..	8	14	" 70

DORMAN, LONG & CO. LIMITED.



COMPOUND GIRDERS.



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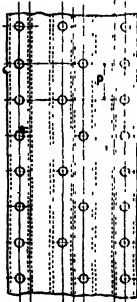
For dimensions and properties of sections see preceding pages.

Reference Mark	SPANS IN FEET											
	8	10	12	14	16	18	20	22	24	26	28	30
B029	204	192	180	
" 30	204	190	176	164	
" 31	188	180	168	154	144	
" 32	204	193	177	163	151	141	
" 33	188	179	164	152	141	131	
" 34	204	197	179	164	151	141	131	
" 35	156	154	142	132	123	
" 36	188	187	168	153	140	129	120	112
" 37	188	173	156	142	130	120	111	104
" 38	.	.	.	204	194	173	156	142	130	120	111	104
" 39	.	.	.	204	185	164	148	135	123	114	106	99
" 40	156	141	128	118	109	101	94
" 41	156	144	130	118	108	100	93	87
" 42	.	.	188	173	152	135	121	110	101	93	87	81
" 43	146	132	119	108	99	92	85	79
" 44	.	.	188	164	144	128	115	105	96	89	82	77
" 45	124	123	111	101	92	85	79	74
" 46	.	.	.	146	134	119	107	97	89	82	76	71
" 47	.	.	.	146	132	117	106	96	88	81	75	70
" 48	253	202	168	144	116	112	101	92	84	78	72	67
" 49	.	.	156	141	123	110	99	90	82	76	71	66
" 50	.	.	146	136	119	106	96	87	80	74	68	64
" 51	.	156	155	133	116	103	93	85	78	72	66	62
" 52	210	168	140	120	105	93	84	76	70	65	60	56
" 53	86	85	77	70	64	59	55	51
" 54	..	145	121	104	91	81	72	66	60	56	52	48
" 55	146	145	121	103	90	80	72	66	60	55	51	48
" 56	146	135	112	96	84	75	67	61	56	52	48	45
" 57	.	.	.	86	83	74	67	61	56	52	48	45
" 58	.	130	108	93	81	72	65	59	54	50	46	43
" 59	.	.	94	87	76	68	61	56	51	47	44	41
" 60	..	94	87	74	65	58	52	47	43	40	37	35
" 61	.	.	86	74	65	58	52	47	43	40	37	35
" 62	.	96	80	69	60	53	48	44	40	37	34	..
" 63	113	90	75	64	56	50	45	41	38	35	32	30
" 64	94	86	71	61	54	48	43	39	36	33	31	29
" 65	.	79	65	56	49	44	39	36	33	30	..	..
" 66	.	.	60	53	46	41	37	33	31	..	..	..
" 67	.	.	60	51	45	40	36	33	30	28	26	..
" 68	64	61	51	43	38	34	30	27	25	23	..	..
" 69	..	51	43	37	32	29	26	23	..	..	..	..
" 70	60	49	41	35	31	27	24	22	..	..	..	..

DORMAN, LONG & CO. LIMITED.

DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.



Reference Mark	COMPOSED OF		Centres of Beams inches	Dimensions in inches	
	Beams	Flats No. Size		Depth	Width
BC 71	24 x 7 1/4 x 100	6 24 x 3/4	7 1/4	27 1/4	24
" 72	24 x 7 1/2 x 100	6 24 x 1/2	7 1/2	27	24
" 73	20 x 7 1/2 x 89	6 24 x 1/2	7 1/2	23 1/4	24
" 74	24 x 7 1/2 x 100	4 24 x 1/2	7 1/2	26 1/2	24
" 75	24 x 7 1/2 x 100	4 24 x 1/2	7 1/2	26	24
" 76	20 x 7 1/2 x 89	6 24 x 1/2	7 1/2	23	24
" 77	18 x 7 x 75	6 24 x 1/2	7 1/2	21 3/4	24
" 78	24 x 7 1/2 x 100	2 24 x 1/2	7 1/2	25 1/2	24
" 79	20 x 7 1/2 x 89	4 24 x 1/2	7 1/2	22 1/2	24
" 80	24 x 7 1/2 x 100	2 24 x 1/2	7 1/2	25 1/4	24
" 81	18 x 7 x 75	6 24 x 1/2	7 1/2	21	24
" 82	20 x 7 1/2 x 89	4 24 x 1/2	7 1/2	22	24
" 83	18 x 7 x 75	4 24 x 1/2	7 1/2	20 1/2	24
" 84	20 x 7 1/2 x 89	2 24 x 1/2	7 1/2	21 1/4	24
" 85	16 x 6 x 62	6 20 x 1/2	6 1/2	19 3/4	20
" 86	18 x 7 x 75	4 24 x 1/2	7 1/2	20	24
" 87	20 x 7 1/2 x 89	2 24 x 1/2	7 1/2	21 1/4	24
" 88	16 x 6 x 62	6 20 x 1/2	6 1/2	19	20
" 89	18 x 7 x 75	2 24 x 1/2	7 1/2	19 1/2	24
" 90	18 x 7 x 75	2 24 x 1/2	7 1/2	19 1/4	24
" 91	16 x 6 x 62	4 20 x 1/2	6 1/2	18 1/2	20
" 92	16 x 6 x 62	4 20 x 1/2	6 1/2	18	20
" 93	14 x 6 x 46	4 20 x 1/2	6 1/2	16 1/2	20
" 94	15 x 5 x 42	4 18 x 1/2	6	17 1/2	18
" 95	16 x 6 x 62	2 20 x 1/2	6 1/2	17 1/4	20
" 96	14 x 6 x 46	4 20 x 1/2	6 1/2	16	20
" 97	15 x 5 x 42	4 18 x 1/2	6	17	18
" 98	16 x 6 x 62	2 20 x 1/2	6 1/2	17	20
" 99	14 x 6 x 46	2 20 x 1/2	6 1/2	15 1/4	20
" 100	15 x 5 x 42	2 18 x 1/2	6	16 1/4	18
" 101	14 x 6 x 46	2 20 x 1/2	6 1/2	15	20
" 102	15 x 5 x 42	2 18 x 1/2	6	16	18

DORMAN, LONG & CO. LIMITED.

PROPERTIES OF COMPOUND GIRDERS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION				Diameter of Rivets inches	Minimum Spans in feet for Pitches (P)			Reference Mark
Area sq. inches	Weight per foot—lbs.	Moment of Inertia	Section Modulus		3"	4"	6"	
178'20	615'5	20526	1479'3	7/8	24	26		B 71
160'20	554	17545	1299'6	7/8		20		" 72
168'51	582'5	14051	1183'2	7/8	20	28		" 73
148'20	510'5	15647	1180'9	7/8		18	28	" 74
136'20	469'5	13821	1063'1	7/8		16	22	" 75
150'51	521	11877	1032'7	7/8	18	22		" 76
156'18	540'5	10953	1007'1	7/8	20	28		" 77
124'20	428'5	12063	946'1	7/8		14	16	" 78
138'51	480'5	10504	933'7	7/8	16	18	28	" 79
118'20	408'5	11210	887'9	7/8		14	16	" 80
138'18	479	9133	869'8	7/8	18	22		" 81
126'51	436'5	919	835'6	7/8		14	22	" 82
126'18	438'5	7991	779'6	7/8		16	28	" 83
114'51	395'5	7937	738'3	7/8		12	18	" 84
129'69	450'5	7085	717'4	7/8	16	22		" 85
114'18	394'5	6903	690'3	7/8		14	22	" 86
108'51	375'5	7332	690	7/8		12	14	" 87
114'69	399'5	5672	618	7/8	14	20		" 88
102'18	353'5	5870	602	7/8		12	18	" 89
96'18	333'5	5372	558'1	7/8		10	16	" 90
104'69	365'5	5115	552'9	7/8	12	16	22	" 91
94'69	328'5	4398	488'6	7/8	10	14	18	" 92
90'59	314'5	3660	443'6	7/8		16	22	" 93
82'05	285	3698	422'7	7/8	14	20	28	" 94
79'69	277'5	3395	393'6	7/8		8	14	" 95
80'59	280'5	3091	386'4	7/8		14	18	" 96
73'05	254'5	3119	366'9	7/8	12	16	22	" 97
74'69	260'5	3080	362'3	7/8		8	12	" 98
65'59	229'5	2303	302	7/8		10	14	" 99
59'55	236'5	2311	284'4	7/8		10	16	" 100
60'59	212'5	2057	274'3	7/8		10	12	" 101
55'05	191	2058	257'2	7/8		8	14	" 102

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COMPOUND GIRDERS.



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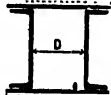
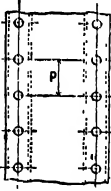
For dimensions and properties of sections see preceding pages.

Reference Mark	SPANS IN FEET											
	8	10	12	14	16	18	20	22	24	26	28	30
B0 71									306	285	264	247
" 72							306	295	271	250	232	217
" 73							282	269	247	228	211	197
" 74						306	295	268	246	227	211	197
" 75					306	295	268	242	222	205	190	177
" 76						282	258	235	215	199	181	172
" 77							234	229	210	194	180	168
" 78				306	296	263	237	215	197	182	169	158
" 79					282	259	233	212	195	180	167	156
" 80				306	277	247	222	202	185	171	159	148
" 81						234	218	198	181	167	155	145
" 82				282	261	232	209	190	174	161	149	139
" 83					234	217	195	177	162	150	139	130
" 84			282	264	231	205	185	168	154	142	132	123
" 85					219	199	179	163	150	138	128	120
" 86				234	216	192	173	157	144	133	123	115
" 87			282	246	216	192	173	157	144	133	123	115
" 88				219	193	172	155	141	129	119	110	103
" 89			234	215	188	167	151	137	125	116	108	100
" 90		234	233	199	174	156	140	127	116	107	100	93
" 91			219	197	173	154	138	126	115	106	99	92
" 92		219	204	175	153	136	122	111	102	94	87	81
" 93					129	121	111	101	92	85	79	74
" 94				141	132	117	106	96	88	81	75	70
" 95	219	197	164	141	123	106	98	90	82	76	70	66
" 96				129	121	107	97	88	81	74	69	64
" 97				141	131	115	102	92	83	76	71	66
" 98	219	181	151	129	113	101	91	82	75	70	65	61
" 99		129	126	108	94	84	75	69	63	58	54	50
" 100		141	119	102	89	79	71	65	59	55	51	47
" 101		129	114	98	86	76	69	62	57	53	49	46
" 102	141	128	107	92	80	71	64	59	54	50	46	43

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DIMENSIONS OF COMPOUND GIRDERS.

For safe distributed loads see following pages.

	Reference Mark	COMPOSED OF				Dimension inches	Dimensions in inches	
		Channels	Flats		Depth		Width	
			No.	Size				
 	00 103	15x4 x41'94	4	14 x 1/2	5 1/2	17 1/2	14	
	" 104	15x4 x41'94	4	14 x 1/2	5 1/2	17	14	
	" 105	12x3 1/2 x26'1	4	14 x 3/4	6 1/2	14 1/2	14	
	" 106	15x4 x41'94	2	14 x 3/4	5 1/2	16 1/4	14	
	" 107	12x3 1/2 x26'1	4	14 x 1/2	6 1/2	14	14	
	" 108	15x4 x41'94	2	14 x 1/2	5 1/2	16	14	
	" 109	10x3 1/2 x23'55	4	14 x 1/2	6 1/2	12	14	
	" 110	10x3 1/2 x23'55	4	12 x 1/2	4 1/2	12	12	
	" 111	12x3 1/2 x26'1	2	14 x 3/4	6 1/2	13 1/4	14	
	" 112	9x3 x19'37	4	12 x 1/2	5 1/2	11	12	
	" 113	10x3 1/2 x23'55	2	14 x 3/4	6 1/2	11 1/4	14	
	" 114	12x3 1/2 x26'1	2	12 x 1/2	4 1/2	13	12	
	" 115	9x3 x19'37	4	10 x 1/2	3 1/2	11	10	
	" 116	10x3 1/2 x23'55	2	12 x 1/2	4 1/2	11	12	
	" 117	9x3 x19'37	2	12 x 3/4	5 1/2	10 1/4	12	
	" 118	9x3 x19'37	2	10 x 1/2	3 1/2	10	10	

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PROPERTIES OF COMPOUND GIRDERS.

For safe distributed loads see following pages.

PROPERTIES OF SECTION				Dia- meter of Rivets inches	Minimum Spans in feet for Pitches (p)			Refer- ence Mark
Area sq. inches	Weight per foot—lbs.	Moment of Inertia	Section Modulus		3"	4"	6"	
59.67	209.	2639	301.6	$\frac{7}{8}$	10	18	24	00 103
52.67	185.5	2188	257.3	$\frac{7}{8}$	10	18	20	" 104
50.35	178.5	1627	224.4	$\frac{7}{8}$	14	22	.	" 105
42.17	147.5	1558	191.7	$\frac{7}{8}$		8	14	" 106
46.35	152.5	1312	187.4	$\frac{3}{4}$	12	20		" 107
38.66	135.5	1361	170.1	$\frac{7}{8}$	.	8	12	" 108
41.85	147.5	920	153.3	$\frac{3}{4}$	12	20	..	" 109
37.85	134.	739	133.1	$\frac{3}{4}$	10	18	.	" 110
32.85	115.5	881	132.9	$\frac{3}{4}$	8	12	18	" 111
35.39	125.5	626	113.8	$\frac{3}{4}$	8	18	..	" 112
31.35	110.5	606	107.7	$\frac{3}{4}$	8	12	18	" 113
27.35	95.5	669	102.9	$\frac{3}{4}$	.	8	14	" 114
31.39	110.5	525	95.4	$\frac{3}{4}$	8	14	..	" 115
25.85	92.	455	82.7	$\frac{3}{4}$.	8	14	" 116
26.39	93.5	405	79.1	$\frac{3}{4}$	8	12	16	" 117
21.39	75.5	294	58.8	$\frac{3}{4}$	1	8	12	" 118

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COMPOUND GIRDERS.



SAFE LOAD IN TONS UNIFORMLY DISTRIBUTED.

For dimensions and properties of sections see preceding pages.

Reference Mark	SPANS IN FEET											
	8	10	12	14	16	18	20	22	24	26	28	30
00 103	..	129	126	108	94	84	75	68	63	58	54	50
" 104	..	129	107	92	80	71	64	58	53	49	46	43
" 105	..	..	..	72	70	62	56	51	47	43	40	..
" 106	120	96	80	68	60	53	48	44	40	37	34	32
" 107	..	..	71	67	59	52	47	43	39	36	33	..
" 108	106	85	71	61	53	47	43	39	36	33	30	28
" 109	..	..	63	55	48	43	38	35	32	..	..	..
" 110	..	63	55	47	42	37	33	30	28	..	..	..
" 111	71	66	55	47	42	37	33	30	28	26	..	..
" 112	59	56	47	41	36	32	28	26	..	..	..	..
" 113	63	54	45	39	34	30	27	24	..	..	..	..
" 114	64	51	43	37	32	29	26	23	21	20	..	..
" 115	59	48	40	34	30	27	24	22	..	..	..	..
" 116	52	41	35	30	23	23	21	19	..	..	..	..
" 117	49	40	33	28	25	22	20	..	..	..	..	..
" 118	36	29	25	21	18	16	14	..	..	..	..	..

STANCHIONS AND STRUTS.

Crippling Loads for various values of $\frac{l}{r}$.—A table shewing the crippling loads, in tons per square inch, on stanchions and struts, for various values of $\frac{l}{r}$ up to 200, is given on page 69.

Tabular Loads.—The safe loads given in the tables are based on the crippling values above referred to, for the least radius of gyration for each section; the factor of safety adopted being 4. They are for stanchions or struts the ends of which may be considered fixed, and only apply to static and concentric loading.

In preparing the table of safe loads on latticed channel stanchions, it has been assumed that the channels are efficiently connected together by lattice bars, or batten plates, so that they act as a unit, thus eliminating all possibility of failure by local flexure of either channel.

Effective length.—In stanchions or struts having intermediate steelwork connections, so arranged as to prevent side flexure where these connections occur, the effect is such that the load transmitted may be considered as acting on the shortened length, and the section determined accordingly.

Limiting lengths for Tabular Loads.—The maximum lengths for which loads are given are based on the lesser of the two values:—

- I. 160 times the least radius of gyration.
- II. 40 times the least width of the section.

Selection of Stanchions.—It will be observed that, in each stanchion table, the sections are arranged in order of their carrying capacity, thus affording a ready means of selection according to requirements.

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Tabular Weights of Stanchions.—The weight given in the table, for each section, is for the shaft, inclusive of rivets; the pitch of rivets for lengths, in general demand, being taken as the basis for calculation in all cases.

The weights of base, cap and fittings are not included, as they depend on the loads and nature of structure.

Properties of Sections.—The radii of gyration and area are given for each section, from which the maximum or minimum moment of inertia may be found, by multiplying the square of the corresponding radius of gyration by the area. These values will be of service when calculating additional stresses due to wind-pressure, eccentric loading, or other forces producing bending.

Condition of Ends.—Under some conditions it is necessary to consider either one or both ends rounded.

In the case of one end fixed, and the other rounded, the allowable load is found by referring in the table to a length of $1\frac{1}{3}$ times the actual length; whilst with both ends rounded the reference length should be $1\frac{1}{2}$ times the actual length.

EXAMPLE.—For a stanchion or strut 9 feet long, with one end fixed and the other rounded, reference should be made in the table of safe loads to a length of 12 feet; or, if both ends are rounded, to a length of 15 feet, when the respective safe loads will be found.

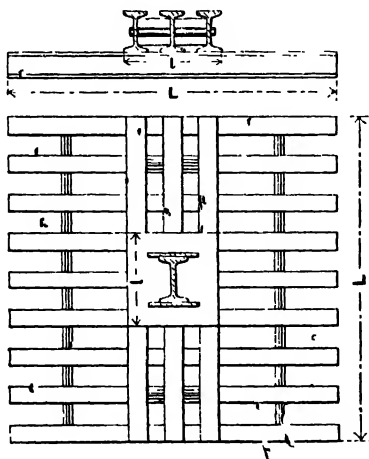
Types of Bases, Caps, Joints, and Girder Connections to Stanchions.—Various types of bases, caps, joints, and girder connections to stanchions are illustrated. In all of these, due consideration has been given to ensure efficiency and simplicity of design.

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Beam Grillages for Stanchions.—For stanchions carrying heavy loads, the necessity for deep excavations and large masses of masonry in foundations, may be considerably reduced by the adoption of suitable grillages, combined with stanchion bases, carefully designed to transmit the load.

These are generally obtained by placing on a layer of concrete, one, two, or three tiers of I beams, according to the load to be distributed, and the bearing capacity of the ground. The beams in each tier should be kept sufficiently far apart to allow of the space being thoroughly filled with concrete. Cast iron separators, with through bolts, are generally employed to effect this. In cases where two or three tiers are found necessary, they should be efficiently secured to each other, and the stanchion base to the whole.

The following diagram illustrates a grillage, consisting of two tiers of beams:—



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The overall dimensions of the lowest tier are determined by the bearing capacity of the ground, and to find the section of beams required in any tier:—

Let W = total load in tons supported by the stanchion.

n = number of beams forming the tier.

w = load in tons supported by one beam = $\frac{W}{n}$.

L = length in feet of each beam.

l = length in feet, at central portion of beam, on which the load above it is distributed.

M = maximum bending moment in foot tons, in one beam (this occurs at the centre of length L).

$$\text{then } M = \left(\frac{w}{2} \times \frac{L}{4} \right) - \left(\frac{w}{2} \times \frac{l}{4} \right) = \frac{w}{8} (L - l).$$

The above bending moment is equivalent to that produced in a beam supported at both ends, and carrying a distributed load " w " over a span = $L - l$. Therefore, on reference to this span in the tables of safe loads, given on pages 46 and 47, the size of beam to carry the load w may be obtained direct.

It should be observed, however, that for reasons given on page 44, under the heading "tabular load," the load w should not exceed the maximum load, given in the table, for the section determined upon.

EXAMPLE.—A grillage has to be provided for a stanchion, on ground having a bearing capacity of 2 tons per square foot, the total load to be supported being 100 tons; assumed size of stanchion base, 2 feet square.

For above load and bearing capacity of ground, two tiers will suffice, and as the area required for the foundation is 50 square feet, the lower tier

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will require to be about 7 feet square; therefore, in this tier, nine beams can be placed side by side at 10 inches centres, the load on each being about $1\frac{1}{2}$ or $11\frac{1}{2}$ tons.

The bending moment produced in each beam is equivalent to this load uniformly distributed over a span of $L - l = 7 - 2 = 5$ feet, and referring to table of safe loads on page 46, it is found that B.S.B. 11, $7 \times 4 \times 16$ lbs. per foot, is a suitable section for the lower tier.

The upper tier will be 2 feet wide, i.e., the width of the stanchion base. In this width three beams can be placed side by side at 9 inches centres, the load on each being about $1\frac{1}{2}$ = 33 tons, which is equivalent to this load uniformly distributed over a span of $L - l = 7 - 2 = 5$ feet, and on reference to the table of safe loads as before, it will be found that D.L.B. 17a, $10 \times 5 \times 35$ lbs. per foot, is a suitable section for this tier.

The above analysis involves the usual fundamental assumptions pertaining to flexure.

The exact conditions involved in these assumptions are not usually obtained in grillage practice, so that results obtained by the above analysis should be carefully interpreted.

Our own practice in designing grillages is on the lines of the above analysis.

Where the loads transmitted are very large, the grillage requires special designing, and in such cases, particular attention should be given to the section of the girders with reference to their ability to carry the loads involved without crippling of the webs.

DORMAN, LONG & CO. LIMITED.

TABLE OF CRIPPLING LOADS

IN TONS PER SQUARE INCH.

For Stanchions or Struts with fixed ends,* and various values of $\frac{l}{r}$, in which
 l = length in inches, and r = radius of gyration in inches.

$\frac{l}{r}$	Crippling Load	$\frac{l}{r}$	Crippling Load	$\frac{l}{r}$	Crippling Load	$\frac{l}{r}$	Crippling Load	$\frac{l}{r}$	Crippling Load
5	23.97	45	22.45	85	18.92	125	13.99	165	9.93
6	23.96	46	22.39	86	18.81	126	13.87	166	9.85
7	23.95	47	22.33	87	18.70	127	13.75	167	9.77
8	23.94	48	22.26	88	18.59	128	13.63	168	9.69
9	23.92	49	22.19	89	18.48	129	13.51	169	9.61
10	23.90	50	22.12	90	18.37	130	13.40	170	9.53
11	23.88	51	22.05	91	18.26	131	13.28	171	9.45
12	23.86	52	21.98	92	18.15	132	13.18	172	9.37
13	23.84	53	21.91	93	18.03	133	13.07	173	9.29
14	23.82	54	21.83	94	17.91	134	12.96	174	9.21
15	23.80	55	21.75	95	17.79	135	12.85	175	9.13
16	23.77	56	21.67	96	17.67	136	12.74	176	9.05
17	23.74	57	21.59	97	17.55	137	12.63	177	8.98
18	23.71	58	21.51	98	17.43	138	12.52	178	8.91
19	23.68	59	21.43	99	17.31	139	12.41	179	8.84
20	23.65	60	21.35	100	17.19	140	12.30	180	8.77
21	23.62	61	21.26	101	17.06	141	12.19	181	8.70
22	23.59	62	21.17	102	16.93	142	12.09	182	8.63
23	23.56	63	21.08	103	16.80	143	11.99	183	8.56
24	23.52	64	20.99	104	16.67	144	11.89	184	8.49
25	23.48	65	20.90	105	16.53	145	11.79	185	8.42
26	23.44	66	20.81	106	16.40	146	11.69	186	8.35
27	23.40	67	20.72	107	16.27	147	11.59	187	8.28
28	23.36	68	20.63	108	16.14	148	11.49	188	8.21
29	23.32	69	20.54	109	16.01	149	11.39	189	8.14
30	23.28	70	20.44	110	15.88	150	11.29	190	8.07
31	23.23	71	20.34	111	15.75	151	11.19	191	8.00
32	23.18	72	20.24	112	15.62	152	11.03	192	7.93
33	23.13	73	20.14	113	15.49	153	11.00	193	7.87
34	23.08	74	20.04	114	15.36	154	10.91	194	7.81
35	23.03	75	19.94	115	15.23	155	10.82	195	7.75
36	22.98	76	19.84	116	15.10	156	10.73	196	7.69
37	22.93	77	19.74	117	14.97	157	10.64	197	7.63
38	22.87	78	19.64	118	14.84	158	10.55	198	7.57
39	22.81	79	19.54	119	14.71	159	10.46	199	7.51
40	22.75	80	19.44	120	14.59	160	10.37	200	7.45
41	22.69	81	19.34	121	14.47	161	10.28	..	..
42	22.63	82	19.24	122	14.35	162	10.19	..	..
43	22.57	83	19.14	123	14.23	163	10.10	..	..
44	22.51	84	19.03	124	14.11	164	10.01	..	..

*The Crippling Loads for other conditions of ends will be sufficiently accurate if found as follows:-

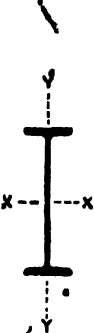
For one end fixed and the other rounded.—Multiply the actual $\frac{l}{r}$ by 1%, and the required Crippling Load will be that given in the table for this value.

For both ends rounded.—Multiply the actual $\frac{l}{r}$ by 1%, and the required Crippling Load will be that given in the table for this value.

DORMAN, LONG & CO. LIMITED.

I BEAMS AS STANCHIONS.

DIMENSIONS AND PROPERTIES.

	Reference Mark	Size inches	Area sq. inches	Weight per foot lbs.	Radii of Gyration in inches	
					About xx	About yy
	18 1	24x7½	29.40	100	9.50	1.50
	" 2	20x7½	26.17	89	7.99	1.54
	" 3	10x8	20.6	70	4.09	1.86
	" 4	18x7	22.06	75	7.21	1.46
	" 5	9x7	17.06	58	3.66	1.64
	" 6	16x6	18.23	62	6.31	1.21
	" 7	15x6	17.35	59	6.02	1.27
	" 8	14x6	16.76	57	5.63	1.29
	" 9	12x6	15.88	54	4.86	1.33
	" 10	14x6	13.53	46	5.70	1.26
	" 11	12x6	12.94	44	4.93	1.31
	" 12	10x6	12.35	42	4.18	1.36
	" 13	8x6	10.29	35	3.27	1.32
	" 14	15x5	12.35	42	5.88	.978
	" 15	12x5	11.47	39	4.77	1.03
	" 16	10x5	10.29	35	4.03	1.07
	" 17	12x5	9.41	32	4.83	1.01
	" 18	10x5	8.82	30	4.06	1.05
	" 19	8x5	8.24	28	3.29	1.11
	" 20	6x5	7.35	25	2.43	1.11
	" 21	6x4½	5.88	20	2.42	.959
	" 22	5x4½	5.29	18	1.07	1.03
	" 23	9x4	6.176	21	3.62	.824
	" 24	8x4	5.294	18	3.24	.822
	" 25	7x4	4.706	16	2.88	.851

DORMAN, LONG & CO. LIMITED.

I BEAMS, AS STANCHIONS.

SAFE LOADS IN TONS.

ENDS FIXED.

For other conditions of ends see page 65.

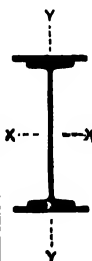
SAFE LOADS IN TONS FOR										Reference Mark
LENGTHS IN FEET										
6	8	10	12	14	16	18	20	22	24	
164	154	143	130	115	100	87	76	..	..	18 1
146	138	129	118	105	92	80	70	..	..	" 2
118	113	108	101	94	86	78	70	62	56	" 3
122	115	106	96	84	73	63	..	..	..	" 4
96	92	86	79	72	64	56	50	..	..	" 5
98	89	79	67	57	48	..	..	..	..	" 6
94	86	77	67	57	48	..	..	..	..	" 7
91	84	76	66	56	48	..	..	..	..	" 8
87	80	73	64	55	47	..	..	..	..	" 9
73	67	60	52	44	37	..	..	..	..	" 10
70	65	59	51	44	38	..	..	..	..	" 11
68	63	57	51	44	38	32	..	..	..	" 12
56	52	47	41	35	30	..	..	..	..	" 13
62	54	44	36	..	..	..	..	..	..	" 14
59	52	43	35	..	..	..	..	..	..	" 15
53	47	40	33	27	..	..	..	..	..	" 16
48	42	35	28	..	..	..	..	..	..	" 17
45	40	34	28	23	..	..	..	..	..	" 18
43	39	33	28	23	..	..	..	..	..	" 19
38	34	30	25	20	..	..	..	..	..	" 20
29	25	21	17	..	..	..	..	..	..	" 21
27	24	20	16	..	..	..	..	..	..	" 22
29	23	18	..	..	..	..	..	..	..	" 23
25	20	15	..	..	..	..	..	..	..	" 24
22	18	14	..	..	..	..	..	..	..	" 25

DERMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

DIMENSIONS AND PROPERTIES.

Reference Mark	COMPOSED OF		Dimensions in inches		Area square inches	Weight per foot—lbs.	Radii of Gyration in inches	
	Beams	Flats	Depth	Width			About xx	About yy
18 24	24 × 7½ × 100	12 × 5½	25½	12 44	40 155	10 53	2 35	
" 27	20 × 7½ × 80	12 × 5½	21½	12 41	17 144	8 90	2 42	
" 28	18 × 7 × 75	12 × 5½	19½	12 37	06 130	8 13	2 47	
" 29	16 × 6 × 62	12 × 5½	17½	12 33	23 117	7 28	2 50	
" 30	15 × 6 × 58	12 × 5½	16½	12 32	35 114	6 91	2 54	
" 31	14 × 6 × 57	12 × 5½	15½	12 31	76 112	6 49	2 56	
" 32	12 × 6 × 54	12 × 5½	13½	12 30	88 107 5	5 62	2 60	
" 33	10 × 8 × 70	10 × 5½	11½	10 33	10 116 5	4 59	2 30	
" 34	16 × 6 × 62	12 × 5½	17	12 30	23 107	7 14	2 38	
" 35	14 × 6 × 46	12 × 5½	15½	12 28	53 101	6 00	2 66	
" 36	12 × 6 × 44	12 × 5½	13½	12 27	94 97 5	5 72	2 69	
" 37	15 × 6 × 59	12 × 5½	16	12 29	35 104	6 78	2 42	
" 38	10 × 6 × 42	12 × 5½	11½	12 27	35 95 5	4 82	1 72	
" 39	14 × 6 × 57	12 × 5½	15	12 28	76 102	6 36	2 45	
" 40	9 × 7 × 58	10 × 5½	10½	10 29	56 104 5	4 19	2 26	
" 41	12 × 6 × 54	12 × 5½	13	12 27	88 97 5	5 50	2 49	
" 42	9 × 7 × 58	9 × 5½	10½	9 28	31 100 5	4 16	2 07	
" 43	14 × 6 × 46	12 × 5½	15	12 25	53 91	6 48	2 55	
" 44	12 × 6 × 44	12 × 5½	13	12 24	94 87 5	5 61	2 56	
" 45	10 × 6 × 42	12 × 5½	11	12 24	35 85 5	4 72	2 62	
" 46	12 × 5 × 39	10 × 5½	13½	10 23	97 84	5 63	2 20	
" 47	8 × 6 × 35	9 × 5½	9½	9 21	54 76	3 85	2 08	
" 48	10 × 5 × 35	9 × 5½	11½	9 21	54 76	4 75	2 02	
" 49	12 × 5 × 32	10 × 5½	13	10 19	41 68 5	5 61	2 19	
" 50	8 × 5 × 28	9 × 5½	9½	9 19	49 69	3 91	2 10	
" 51	8 × 6 × 35	9 × 5½	9	9 19	29 68 5	3 76	2 01	
" 52	10 × 5 × 30	8 × 5½	11½	8 18	82 66 5	4 77	1 83	
" 53	8 × 5 × 28	9 × 5½	9	9 17	24 61 5	3 82	2 02	
" 54	10 × 5 × 30	8 × 5½	11	8 18	32 60	4 66	1 76	



DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

ENDS FIXED.

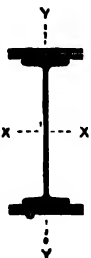
For other conditions of ends see page 65.

SAFE LOADS IN TONS FOR														Reference Mark
LENGTHS IN FEET														
8	10	12	14	16	18	20	22	24	26	28	30	32	34	
252	245	236	225	214	202	188	173	159	145	133	122	..	..	18 26
234	228	220	211	201	190	178	165	151	139	128	118	108	..	" 27
211	206	199	191	182	173	162	151	139	128	118	109	100	..	" 28
190	185	179	172	164	156	147	137	126	116	107	99	91	..	" 29
185	181	175	168	161	153	144	135	125	115	106	98	90	..	" 30
182	177	172	165	158	151	142	133	123	114	105	97	90	83	" 31
177	173	168	162	155	148	140	131	122	113	104	96	88	82	" 32
187	182	175	167	158	148	138	128	116	106	97	88	..	..	" 33
172	167	161	154	146	138	129	119	109	100	92	84	..	..	" 34
164	160	156	150	144	138	131	123	115	107	99	91	84	78	" 35
161	157	153	148	142	136	129	122	114	106	98	91	84	78	" 36
167	163	157	150	143	135	127	117	108	99	91	84	77	..	" 37
157	154	150	145	139	133	127	120	112	104	97	90	83	77	" 38
164	160	154	148	141	133	125	116	107	99	91	83	77	..	" 39
167	162	155	148	140	131	121	111	101	92	84	77	..	..	" 40
159	155	150	144	138	131	123	114	105	97	90	83	76	..	" 41
158	152	145	137	128	118	107	97	88	79	..	..	..	..	" 42
146	142	138	133	127	121	114	107	99	91	84	78	72	..	" 43
143	139	135	130	125	119	112	105	98	90	83	77	71	66	" 44
140	136	132	128	123	117	111	104	97	90	83	77	71	66	" 45
135	131	125	119	112	104	96	87	80	73	66	..	..	..	" 46
121	116	110	104	98	90	82	74	67	61	..	..	..	..	" 47
120	115	109	103	96	88	79	72	65	59	..	..	..	..	" 48
109	106	101	96	90	84	77	70	64	58	53	..	..	..	" 49
109	105	100	95	89	82	75	68	62	56	51	..	..	..	" 50
108	103	98	92	86	78	71	64	58	52	..	..	..	..	" 51
103	98	92	86	78	70	63	56	50	..	..	..	..	..	" 52
96	92	87	82	77	70	63	57	52	47	..	..	..	..	" 53
92	87	81	75	69	60	53	48	..	..	..	..	..	..	" 54

DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

DIMENSIONS AND PROPERTIES.



Reference Mark	COMPOSED OF		Dimen- sions in inches		Area square inches	Weight per foot—lbs.	Radii of Gyration in inches	
	Beams	Flats	Depth	Width			About xx	About yy
18 55	24×7½×100	14×5½	26½	14	64'40	223	11'31	3'14
" 56	20×7½×80	14×5½	22½	14	61'17	212	9'59	3'22
" 57	18×7 × 75	14×5½	20½	14	57'06	198	8'77	3'29
" 58	10×8 × 70	14×5½	12½	14	55'60	193	5'11	3'40
" 59	24×7½×100	14×½	26	14	57'40	199'5	11'07	3'02
" 60	20×7½×80	14×½	22	14	54'17	188'5	9'37	3'10
" 61	18×7 × 75	14×½	20	14	50'06	174'5	8'57	3'17
" 62	10×8 × 70	14×½	12	14	48'60	169'5	4'95	3'29
" 63	16×6 × 62	12×5	18½	12	48'23	168	7'83	2'83
" 64	15×6 × 59	12×5½	17½	12	47'35	165	7'42	2'86
" 65	14×6 × 57	12×5½	16½	12	46'76	163	6'98	2'88
" 66	12×6 × 54	12×5½	14½	12	45'88	158'5	6'07	2'90
" 67	10×8 × 70	10×5½	12½	10	45'60	159	4'99	2'47
" 68	16×6 × 62	12×½	18	12	42'23	147'5	7'63	2'73
" 69	15×6 × 59	12×½	17	12	41'35	144'5	7'23	2'76
" 70	14×6 × 57	12×½	16	12	40'76	142'5	6'80	2'78
" 71	12×6 × 54	12×½	14	12	39'88	138'5	5'90	2'81
" 72	9×7 × 58	10×5½	11½	10	42'06	147	4'66	2'46
" 73	10×8 × 70	10×½	12	10	40'60	142	4'80	2'42
" 74	10×6 × 42	12×½	12	12	36'35	126'5	5'08	2'92
" 75	9×7 × 58	9×5½	11½	9	39'56	138'5	4'56	2'23
" 76	9×7 × 58	9×½	11	9	35'06	123'5	4'40	2'18
" 77	10×5 × 35	8×5½	12½	8	30'29	105'5	5'15	1'98
" 78	8×6 × 35	9×½	10	8	26'29	99	4'10	2'22
" 79	10×5 × 30	8×½	12	8	21'82	87	5'04	1'95

DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

ENDS FIXED.

For other conditions of ends see page 65.

SAFE LOADS IN TONS FOR

LENGTHS IN FEET

8	10	12	14	16	18	20	22	24	26	28	32	36	40	Reference Mark
374	368	361	352	342	331	319	306	293	278	262	230	202	177	18 55
356	350	344	336	327	317	306	294	282	269	254	224	198	174	" 56
333	327	321	314	306	297	287	277	266	254	241	214	189	167	" 57
325	320	314	308	301	292	283	273	263	253	241	215	191	169	" 58
333	327	320	311	302	291	280	268	255	241	226	..	..	..	" 59
315	309	303	295	287	277	267	256	244	232	218	..	..	..	" 60
291	286	281	274	267	258	249	239	229	218	205	181	159	140	" 61
283	279	274	268	261	253	245	236	226	216	206	182	161	142	" 62
278	273	266	258	249	239	228	217	205	191	178	154	133	..	" 63
273	268	262	254	245	235	225	214	202	189	176	153	132	..	" 64
270	265	259	251	243	233	223	213	201	188	176	152	132	..	" 65
265	260	254	247	238	229	220	209	198	186	173	151	131	..	" 66
260	253	245	235	224	213	200	186	171	158	145	123	..	..	" 67
243	238	232	224	216	206	196	186	174	162	150	129	111	..	" 68
238	233	227	220	212	203	193	183	172	160	149	128	110	..	" 69
235	230	224	217	209	200	191	181	170	159	148	127	110	..	" 70
230	225	220	213	205	197	188	179	169	157	146	126	109	..	" 71
240	233	226	217	207	196	184	171	157	145	133	..	..	..	" 72
231	225	217	208	198	187	175	162	149	137	126	106	..	..	" 73
210	206	201	196	189	182	175	167	158	148	138	120	104	..	" 74
223	216	207	197	186	174	160	146	133	122	111	..	..	..	" 75
197	191	182	173	163	152	139	127	115	105	96	..	..	..	" 76
168	161	153	143	133	121	109	99	89	80	..	..	..	..	" 77
160	154	148	141	133	124	114	104	95	87	79	..	..	..	" 78
138	132	125	117	108	93	88	79	71	64	..	..	..	..	" 79

DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

DIMENSIONS AND PROPERTIES.

Reference Mark	COMPOSED OF		Centres of Beams	Dimensions in inches		Area Square Inches	Weight per foot-lb.	Radius of Gyration in inches	
	Beams	Flats		Depth	Width			About xx	About yy
18 80	24 x 7 $\frac{1}{2}$	100 18	9 $\frac{1}{2}$	25 $\frac{1}{2}$	18	31.3	280.5	10.35	5.04
" 81	20 x 7 $\frac{1}{2}$	89 18	9 $\frac{1}{2}$	21 $\frac{1}{2}$	18	74.84	258.5	8.75	5.05
" 82	18 x 7	75 18	9 $\frac{1}{2}$	19 $\frac{1}{2}$	18	66.62	230.5	7.98	5.04
" 83	18 x 7	75 16	8	19 $\frac{1}{2}$	16	64.12	222	7.93	4.37
" 84	16 x 6	62 16	8 $\frac{1}{2}$	17 $\frac{1}{2}$	16	56.46	196	7.08	4.49
" 85	14 x 6	57 16	8 $\frac{1}{2}$	15 $\frac{1}{2}$	16	53.52	186	6.31	4.50
" 86	16 x 6	62 16	8 $\frac{1}{2}$	17	16	52.46	182.5	6.95	4.48
" 87	14 x 6	57 16	8 $\frac{1}{2}$	15	16	49.52	172.5	6.20	4.49
" 88	14 x 6	46 16	8 $\frac{1}{2}$	15 $\frac{1}{2}$	16	47.06	164	6.43	4.51
" 89	12 x 6	54 14	7	13 $\frac{1}{2}$	14	49.26	170	5.42	3.85
" 90	12 x 6	54 14	7	13	14	45.76	158.5	5.32	3.83
" 91	14 x 6	46 16	8 $\frac{1}{2}$	15	16	43.06	150.5	6.32	4.50
" 92	12 x 6	44 14	7	13 $\frac{1}{2}$	14	43.38	150	5.53	3.86
" 93	10 x 6	42 14	7	11 $\frac{1}{2}$	14	42.20	146	4.66	3.87
" 94	12 x 6	44 14	7	13	14	39.88	138.5	5.43	3.84
" 95	10 x 6	42 14	7	11	14	38.0	134.5	4.57	3.86
18 96	24 x 7 $\frac{1}{2}$	100 18	9 $\frac{1}{2}$	25 $\frac{1}{2}$	18	103.8	357	10.96	5.07
" 97	20 x 7 $\frac{1}{2}$	89 18	9 $\frac{1}{2}$	22 $\frac{1}{2}$	18	97.34	335	9.39	5.08
" 98	18 x 7	75 18	9 $\frac{1}{2}$	20 $\frac{1}{2}$	18	89.12	307	8.52	5.08
" 99	18 x 7	75 16	8	20 $\frac{1}{2}$	16	84.12	290	8.45	4.43
" 100	16 x 6	62 16	8 $\frac{1}{2}$	18 $\frac{1}{2}$	16	76.46	264	7.61	4.52
" 101	14 x 6	57 16	8 $\frac{1}{2}$	16 $\frac{1}{2}$	16	73.52	254	6.79	4.53
" 102	16 x 6	62 16	8 $\frac{1}{2}$	18	16	68.46	237	7.41	4.51
" 103	14 x 6	57 16	8 $\frac{1}{2}$	16	16	65.52	227	3.61	4.52
" 104	12 x 6	54 14	7	14 $\frac{1}{2}$	14	66.76	229.5	5.86	3.90
" 105	14 x 6	46 16	8 $\frac{1}{2}$	16	16	59.06	205	6.74	4.53
" 106	12 x 6	54 14	7	14	14	59.76	206	5.69	3.88
" 107	12 x 6	44 14	7	14	14	53.88	186	5.80	3.89
" 108	10 x 6	42 14	7	12	14	52.70	182	4.91	3.91
18 109	24 x 7 $\frac{1}{2}$	100 18	9 $\frac{1}{2}$	27 $\frac{1}{2}$	18	126.3	435.5	11.47	5.09
" 110	20 x 7 $\frac{1}{2}$	89 18	9 $\frac{1}{2}$	23 $\frac{1}{2}$	18	119.84	413.5	9.76	5.10
" 111	18 x 7	75 18	9 $\frac{1}{2}$	21 $\frac{1}{2}$	18	111.62	385.5	8.97	5.10
" 112	18 x 7	75 16	8	21 $\frac{1}{2}$	16	104.12	360	8.89	4.46
" 113	16 x 6	62 16	8 $\frac{1}{2}$	19 $\frac{1}{2}$	16	96.16	334	8.05	4.54
" 114	14 x 6	57 16	8 $\frac{1}{2}$	17 $\frac{1}{2}$	16	93.52	324	7.21	4.55
" 115	16 x 6	62 16	8 $\frac{1}{2}$	19	16	84.46	293.5	7.79	4.53
" 116	14 x 6	57 16	8 $\frac{1}{2}$	17	16	81.52	283.5	6.96	4.54
" 117	12 x 6	54 14	7	15 $\frac{1}{2}$	14	84.26	290.5	6.25	3.93
" 118	12 x 6	54 14	7	15	14	76.76	255	6.02	3.91

DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

ENDS FIXED.

For other conditions of ends see page 65.

SAFE LOADS IN TONS FOR

LENGTHS IN FEET

10	12	14	16	18	20	22	24	26	28	30	32	36	40	Reference Mark
478	474	470	465	459	453	446	439	431	422	413	403	388	361	18 80
440	437	433	428	423	417	411	404	396	388	380	371	353	333	" 81
392	389	385	381	376	371	366	360	353	346	338	330	314	296	" 82
375	371	366	361	355	349	342	334	326	317	308	298	278	255	" 83
330	327	323	319	314	309	303	296	289	282	274	266	249	230	" 84
313	310	306	302	298	293	287	281	274	267	260	253	237	218	" 85
307	304	300	296	292	287	281	275	269	262	255	247	231	213	" 86
290	287	284	280	276	271	266	260	254	247	240	233	218	202	" 87
275	273	270	266	262	258	253	247	241	235	229	222	208	192	" 88
286	282	278	273	267	260	253	246	238	230	221	212	192	173	" 89
266	262	258	253	248	242	235	228	221	213	205	196	178	160	" 90
252	250	247	244	240	236	231	226	221	215	209	203	190	173	" 91
252	248	244	240	235	229	223	217	210	203	195	187	168	153	" 92
245	242	238	234	229	223	217	211	204	197	190	182	165		" 93
231	228	225	221	216	211	205	199	193	186	179	171	155	140	" 94
225	222	218	214	210	205	199	193	187	181	174	167	151		" 95
611	606	600	594	587	579	570	561	550	539	528	516	490	463	18 96
573	568	563	557	550	543	535	526	516	506	495	484	460	434	" 97
525	520	515	510	503	497	490	482	473	462	453	443	421	398	" 98
492	487	481	474	467	459	450	440	429	418	406	394	367	339	" 99
448	443	438	432	426	419	411	402	393	383	373	362	339	313	" 100
430	426	421	416	410	403	395	387	378	368	358	348	326	302	" 101
401	397	392	387	381	375	367	359	351	342	333	324	303	280	" 102
384	380	375	370	365	359	352	344	336	328	319	310	290	268	" 103
388	383	377	370	363	354	345	335	325	314	302	290	263	237	" 104
316	312	308	303	297	291	284	277	270	262	253	244	224	202	" 105
347	343	337	331	324	317	308	299	290	280	270	259	235	211	" 106
318	309	304	299	292	285	278	270	262	253	244	234	212	191	" 107
306	302	297	292	286	280	272	264	256	248	239	229	208	188	" 108
743	737	730	723	714	705	694	683	670	657	643	628	598	564	18 109
705	700	693	686	678	669	659	648	637	624	611	597	568	536	" 110
657	652	646	639	631	623	614	604	593	581	569	556	529	499	" 111
609	603	596	588	579	569	557	545	532	518	504	489	457	421	" 112
565	559	553	545	537	529	518	507	496	483	470	457	429	396	" 113
548	542	536	529	521	513	503	492	481	469	457	444	416	385	" 114
495	490	484	477	470	463	454	444	434	423	412	400	375	346	" 115
477	473	467	461	454	447	438	429	419	409	398	387	362	335	" 116
490	483	478	468	458	449	436	424	411	397	383	368	335	302	" 117
429	423	416	409	401	391	381	370	359	347	335	321	292	263	" 118

DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.

DIMENSIONS AND PROPERTIES.

	Reference Mark	COMPOSED OF		Centres of Beams	Dimensions in inches		Area square inches	Weight per foot—lbs.	Radii of Gyration in inches	
		Beams	Flats		Depth	Width			About xx	About yy
	118	24 × 7½ × 100	24 × 5½	7½	25¼	24	118·20	410	10·28	6·68
	120	20 × 7½ × 89	24 × 5½	7½	21¼	24	108·51	377	8·69	6·70
	121	18 × 7 × 75	24 × 5½	7½	19¼	24	96·18	335	7·93	6·69
	122	16 × 6 × 62	20 × 5½	6½	17¼	20	79·69	279	7·00	5·55
	123	24 × 7½ × 100	24 × 5½	7½	26¼	24	148·2	512	10·88	6·73
	124	20 × 7½ × 89	24 × 5½	7½	22¼	24	138·51	479	9·22	6·75
	125	18 × 7 × 75	24 × 5½	7½	20¼	24	126·18	437	8·45	6·75
	126	16 × 6 × 62	20 × 5½	6½	18¼	20	104·69	363	7·51	5·60
	127	24 × 7½ × 100	24 × 5½	7½	27¼	24	178·2	618·5	11·37	6·77
	128	20 × 7½ × 89	24 × 5½	7½	23¼	24	168·51	585·5	9·68	6·78
	129	18 × 7 × 75	24 × 5½	7½	21¼	24	156·18	543·5	8·89	6·78
	130	16 × 6 × 62	20 × 5½	6½	19¼	20	129·69	453·5	7·94	5·63
	Reference Mark	COMPOSED OF			Dimensions in inches		Area square inches	Weight per foot—lbs.	Radii of Gyration in inches	
		Beams	Beams		Depth	Width			About xx	About yy
	131	20 × 7½ × 89	10 × 8 × 70		20	20	67·37	231	5·18	5·32
	132	18 × 7 × 75	9 × 7 × 58		18	18	56·18	193	4·70	4·78
	133	16 × 6 × 62	8 × 6 × 35		16	16	38·81	134	4·42	4·00
	134	14 × 6 × 57	8 × 6 × 35		14	16	37·34	129	3·90	4·07
	Reference Mark	COMPOSED OF			Dimensions in inches		Area square inches	Weight per foot—lbs.	Radii of Gyration in inches	
		Zeds	Flats		Depth	Width			About xx	About yy
	28	8 × 3½ × 22	68		16	16	31·68	110	4·82	4·70
	2	7 × 3½ × 20	22		14	15	28·29	98	4·26	4·27
	3	6 × 3½ × 17	88		12	14	25·03	87	3·69	3·85
	4	5 × 3 × 14	17		10	12	20·18	70·5	3·07	3·84

DORMAN, LONG & CO. LIMITED.

COMPOUND STANCHIONS.,

SAFE LOADS IN TONS.

ENDS FIXED.

For other conditions of ends see page 65.

SAFE LOADS IN TONS FOR

LENGTHS IN FEET

10	12	14	16	18	20	22	24	28	32	36	40	Reference Mark
701	698	694	689	684	679	673	667	653	637	619	599	18 119
643	640	637	633	629	624	618	612	600	585	563	550	" 120
570	568	565	561	557	553	548	543	532	519	503	487	" 121
470	467	463	459	454	449	444	438	424	409	392	374	" 122
879	875	870	865	859	852	845	837	820	800	777	752	18 123
821	818	813	808	803	797	790	782	767	748	727	704	" 124
748	745	741	736	731	725	719	713	698	681	662	641	" 125
618	614	609	604	598	591	584	576	559	538	516	493	" 126
1057	1052	1046	1040	1033	1025	1016	1007	987	963	936	907	18 127
999	995	990	984	977	969	961	952	933	911	885	858	" 128
926	922	917	913	905	898	891	883	865	844	821	795	" 129
766	761	755	748	741	733	724	715	693	668	641	613	" 130

SAFE LOADS IN TONS FOR

LENGTHS IN FEET

10	12	14	16	18	20	22	24	26	28	30	32	36	40	Reference Mark
397	394	390	386	382	377	371	366	359	352	345	338	322	304	18 131
330	327	323	319	315	310	304	298	292	285	278	271	255	238	" 132
226	223	220	216	212	207	202	197	191	185	178	171	157	142	" 133
217	214	211	207	203	198	193	187	182	175	169	162	147	133	" 134

SAFE LOADS IN TONS FOR

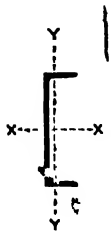
LENGTHS IN FEET

10	12	14	16	18	20	22	24	26	28	30	32	36	40	Reference Mark
186	184	182	180	177	174	171	168	165	161	157	153	144	134	18 1
165	163	161	159	156	153	150	146	142	138	134	130	120	110	" 2
145	143	140	137	134	131	127	123	119	114	109	104	94	84	" 3
115	113	110	107	103	99	95	90	85	80	75	70	..	..	" 4

DORMAN, LONG & CO. LIMITED.

CHANNEL STANCHIONS.

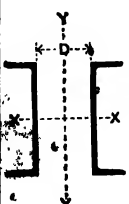
DIMENSIONS AND PROPERTIES.



Reference Mark	Size Inches	Area square inches	Weight per foot lbs.	Radii of Gyration in inches	
				About XX	About YY
OS 1	15 x 4	12.334	41.94	5.53	1.09
" 2	12 x 4	10.727	36.47	4.51	1.13
" 3	10 x 4	8.871	30.16	3.84	1.16
" 4	12 x 3½	9.071	32.88	4.44	.96
" 5	11 x 3½	8.771	29.32	4.12	.98
" 6	10 x 3½	8.263	28.21	3.77	.99
" 7	12 x 3½	7.675	26.10	4.55	.99
" 8	9 x 3½	7.469	25.39	3.43	1.01
" 9	10 x 3	6.925	23.55	3.85	1.02
" 10	8 x 3½	6.682	22.72	3.09	1.03
" 11	9 x 3½	6.55	22.27	3.49	1.03
" 12	7 x 3½	5.95	20.23	2.74	1.04
" 13	6 x 3½	5.266	17.90	2.37	1.06
" 14*	8 x 3	5.675	19.30	3.07	.87
" 15	9 x 3	5.696	19.37	3.38	.84
" 16	7 x 3	5.166	17.56	2.70	.88
" 17	6 x 3	4.728	16.08	1.96	.85
" 18	6 x 3	4.261	14.49	2.37	.91
" 19	4 x 3	4.175	14.20	1.56	.91

LATTICED CHANNEL STANCHIONS.

DIMENSIONS AND PROPERTIES.



Reference Mark	COMPOSED OF Channel	Distance between flanges inches	Dimensions in inches		Area square inches	Radii of Gyration in inches	
			Depth	Width		About XX	About YY
OS 20	15 x 4 x 41.94	9½	15	17½	24.67	5.52	5.78
" 21	12 x 3½ x 32.88	6½	12	13½	19.34	4.44	4.22
" 22	11 x 3½ x 29.82	6½	11	13½	17.54	4.11	4.26
" 23	12 x 3½ x 26.1	6½	12	13½	15.35	4.54	4.23
" 24	10 x 3½ x 28.21	4½	10	11½	16.59	3.77	3.33
" 25	9 x 3½ x 25.39	4½	9	11½	14.93	3.43	3.37
" 26	10 x 3½ x 23.55	4½	10	11½	13.85	3.85	3.34
" 27	9 x 3½ x 22.27	4½	9	11½	13.10	3.49	3.39
" 28	9 x 3 x 19.37	5½	9	11½	11.39	3.38	3.6
" 29	7 x 3 x 17.56	3½	7	9½	10.33	2.7	2.76

DORMAN, LONG & CO. LIMITED.

CHANNEL COMPOUND STANCHIONS.

DIMENSIONS AND PROPERTIES.

Reference Mark	COMPOSED OF		Distance in inches D	Dimensions in inches		Area square inches	Weight per foot—lbs.	Radii of Gyration in inches	
	Channels	Flats		Depth	Width			About xx	About yy
08 30	15×4	×41'94	18× $\frac{5}{8}$	9 $\frac{1}{2}$	16 $\frac{1}{4}$	18'47	171	6'71	5'51
" 31	15×4	×41'94	18× $\frac{1}{2}$	9 $\frac{1}{2}$	16	18'42	147	6'55	5'54
" 32	12×3 $\frac{1}{2}$	×32'88	14× $\frac{5}{8}$	6 $\frac{1}{2}$	13 $\frac{1}{4}$	14'36	128	5'41	4'14
" 33	11×3 $\frac{1}{2}$	×29'82	14× $\frac{1}{2}$	6 $\frac{1}{2}$	12 $\frac{1}{2}$	14'35	122	5'03	4'15
" 34	12×3 $\frac{1}{2}$	×32'88	14× $\frac{1}{2}$	6 $\frac{1}{2}$	13	14'33	116	5'27	4'15
" 35	12×3 $\frac{1}{2}$	×26'1	14× $\frac{5}{8}$	6 $\frac{1}{2}$	13 $\frac{1}{4}$	14'32	114	5'55	4'13
" 36	11×3 $\frac{1}{2}$	×29'82	14× $\frac{1}{2}$	6 $\frac{1}{2}$	12	14'31	110	4'91	4'16
" 37	10×3 $\frac{1}{2}$	×28'21	12× $\frac{5}{8}$	4 $\frac{1}{2}$	11 $\frac{1}{2}$	12'31	99	4'57	3'40
" 38	12×3 $\frac{1}{2}$	×26'1	14× $\frac{1}{2}$	6 $\frac{1}{2}$	13	14'29	102	5'42	4'14
" 39	9×3 $\frac{1}{2}$	×25'39	12× $\frac{5}{8}$	4 $\frac{1}{2}$	10 $\frac{1}{2}$	12'29	94	4'18	3'42
" 40	10×3 $\frac{1}{2}$	×28'21	12× $\frac{1}{2}$	4 $\frac{1}{2}$	11	12'28	100	4'45	3'39
" 41	9×3 $\frac{1}{2}$	×25'39	12× $\frac{1}{2}$	4 $\frac{1}{2}$	10	12'26	94	4'07	3'41
" 42	10×3 $\frac{1}{2}$	×23'55	12× $\frac{1}{2}$	4 $\frac{1}{2}$	11	12'25	90	4'55	3'40
" 43	9×3 $\frac{1}{2}$	×22'27	12× $\frac{1}{2}$	4 $\frac{1}{2}$	10	12'25	88	4'14	3'42
" 44	9×3	×19'37	12× $\frac{1}{2}$	5 $\frac{1}{2}$	10	12'23	82	4'14	3'53
" 45	7×3	×17'56	10× $\frac{1}{2}$	3 $\frac{1}{2}$	8	10'20	72	3'26	2'82
" 46	7×3	×17'56	10× $\frac{3}{8}$	3 $\frac{1}{2}$	7 $\frac{1}{2}$	10'17	63	3'15	2'82
08 47	15×4	×41'94	18× $\frac{5}{8}$	9 $\frac{1}{2}$	17 $\frac{1}{2}$	18'69	239	7'31	5'41
" 48	15×4	×41'94	18× $\frac{1}{2}$	9 $\frac{1}{2}$	17	18'60	209	7'1	5'44
" 49	12×3 $\frac{1}{2}$	×32'88	14× $\frac{5}{8}$	6 $\frac{1}{2}$	14 $\frac{1}{2}$	14'54	187	5'95	4'10
" 50	11×3 $\frac{1}{2}$	×29'82	14× $\frac{1}{2}$	6 $\frac{1}{2}$	13 $\frac{1}{2}$	14'52	181	5'54	4'11
" 51	12×3 $\frac{1}{2}$	×32'88	14× $\frac{1}{2}$	6 $\frac{1}{2}$	14	14'47	163	5'75	4'12
" 52	11×3 $\frac{1}{2}$	×29'82	14× $\frac{1}{2}$	6 $\frac{1}{2}$	13	14'45	157	5'30	4'12
" 53	12×3 $\frac{1}{2}$	×26'1	14× $\frac{1}{2}$	6 $\frac{1}{2}$	14	14'43	150	5'88	4'11
" 54	10×3 $\frac{1}{2}$	×28'21	12× $\frac{5}{8}$	4 $\frac{1}{2}$	12 $\frac{1}{2}$	12'46	161	5'05	3'42
" 55	9×3 $\frac{1}{2}$	×25'39	12× $\frac{5}{8}$	4 $\frac{1}{2}$	11 $\frac{1}{2}$	12'44	155	4'63	3'43
" 56	10×3 $\frac{1}{2}$	×28'21	12× $\frac{1}{2}$	4 $\frac{1}{2}$	12	12'40	141	4'87	3'41
" 57	9×3 $\frac{1}{2}$	×25'39	12× $\frac{1}{2}$	4 $\frac{1}{2}$	11	12'38	135	4'47	3'43
" 58	10×3 $\frac{1}{2}$	×23'55	12× $\frac{1}{2}$	4 $\frac{1}{2}$	12	12'37	131	4'96	3'42
" 59	9×3 $\frac{1}{2}$	×22'27	12× $\frac{1}{2}$	4 $\frac{1}{2}$	11	12'37	129	4'53	3'44
" 60	9×3	×19'37	12× $\frac{1}{2}$	5 $\frac{1}{2}$	11	12'35	123	4'55	3'50
" 61	7×3	×17'56	10× $\frac{1}{2}$	3 $\frac{1}{2}$	9	10'30	106	3'61	2'84
" 62	7×3	×17'56	10× $\frac{3}{8}$	3 $\frac{1}{2}$	8 $\frac{1}{2}$	10'25	99	3'45	2'84
08 63	15×4	×41'94	18× $\frac{5}{8}$	9 $\frac{1}{2}$	18 $\frac{1}{2}$	18'92	271	7'78	5'36
" 64	15×4	×41'94	18× $\frac{1}{2}$	9 $\frac{1}{2}$	18	18'78	271	7'51	5'39
" 65	12×3 $\frac{1}{2}$	×32'88	14× $\frac{1}{2}$	6 $\frac{1}{2}$	15	14'61	212	6'12	4'10

DORMAN, LONG & CO., LIMITED.

CHANNEL COMPOUND STANCHIONS.

SAFE LOADS IN TONS.

ENDS FIXED.

For other conditions of ends see page 65.

SAFE LOADS IN TONS FOR														Reference Mark
LENGTHS IN FEET														
10	12	14	16	18	20	22	24	26	28	30	32	36	40	
278	276	274	272	269	266	263	259	255	251	246	241	231	220	08 30
252	250	248	246	244	241	238	235	231	227	223	219	210	200	" 31
215	212	209	206	202	198	193	188	183	178	172	166	153	139	" 32
204	202	199	196	193	189	184	179	174	169	164	158	146	133	" 33
194	192	189	186	183	179	175	171	166	161	156	151	139	126	" 34
191	189	186	183	180	177	172	168	163	158	153	148	136	124	" 35
184	182	179	176	173	170	166	162	158	153	148	143	132	120	" 36
182	179	175	171	168	161	156	150	144	137	130	122	109	..	" 37
171	169	167	164	161	158	154	150	146	142	137	132	122	111	" 38
172	169	166	162	158	153	148	142	136	130	124	117	..	..	" 39
165	162	158	154	150	145	140	135	130	124	117	110	98	..	" 40
155	152	149	146	142	138	133	128	123	117	111	105	..	..	" 41
149	146	143	140	136	132	127	122	117	112	106	100	89	..	" 42
145	142	139	136	132	128	124	119	114	109	104	98	..	..	" 43
135	133	130	127	124	121	117	113	109	104	99	94	..	..	" 44
115	112	109	105	101	96	91	86	80	..	..	..	..	..	" 45
101	98	95	92	88	84	80	75	70	..	..	..	..	..	" 46
411	408	405	401	396	392	387	381	375	368	361	354	339	322	08 47
357	355	353	349	345	341	337	332	327	321	315	309	296	282	" 48
317	313	308	303	298	292	285	277	269	261	253	244	224	203	" 49
306	302	298	294	288	282	275	268	261	253	245	236	217	197	" 50
276	273	269	265	260	254	248	242	235	228	221	213	196	178	" 51
265	262	259	255	250	245	239	233	226	219	212	205	189	171	" 52
253	250	246	242	238	233	227	221	215	209	202	195	179	163	" 53
268	264	258	252	245	238	230	221	212	203	192	181	161	143	" 54
259	254	249	244	237	230	222	214	205	196	186	176	156	..	" 55
234	230	225	220	214	207	200	193	185	176	167	158	140	124	" 56
224	220	216	211	205	199	192	185	178	170	161	152	135	..	" 57
218	214	210	205	199	193	187	180	172	164	156	148	131	116	" 58
214	210	206	201	196	190	184	177	170	162	154	145	129	..	" 59
203	200	197	193	188	182	176	170	163	156	149	141	125	..	" 60
172	167	162	157	151	144	137	129	121	112	104	..	..	..	" 61
143	140	136	131	126	120	114	108	101	94	..	..	..	..	" 62
543	539	535	530	524	518	511	504	495	486	477	467	447	424	08 63
464	461	457	452	447	442	436	430	423	416	408	400	382	363	" 64
357	353	348	343	336	329	321	313	304	295	285	275	253	229	" 65

DORMAN, LONG & CO. LIMITED.

TEES AS STRUTS.

SAFE LOADS IN TONS FOR TEES.

ENDS FIXED.

For other conditions of ends see page 65.

Size and Thickness	LENGTH IN FEET										
	2	3	4	5	6	7	8	9	10	12	
6 x 4 x $\frac{3}{8}$	21.5	21.1	20.5	19.9	19.1	18.2	17.2	16.2	15.0	12.5	
" " $\frac{1}{2}$	23.2	22.7	22.0	21.1	20.1	19.1	18.2	17.2	16.2	15.0	
" " $\frac{5}{8}$	24.7	24.0	23.2	22.1	21.1	20.1	19.1	18.2	17.2	16.2	
6 x 3 x $\frac{3}{8}$	17.0	16.3	15.4	14.5	13.4	12.4	11.4	10.4	9.1	..	
" " $\frac{1}{2}$	24.8	23.9	22.7	21.1	19.4	17.4	15.3	13.4	11.8	..	
" " $\frac{5}{8}$	30.5	29.4	27.8	25.9	23.7	21.1	18.5	16.2	14.2	..	
5 x 4 x $\frac{3}{8}$	19.2	18.3	17.3	16.2	15.0	13.9	12.8	11.8	10.6	8.4	
" " $\frac{1}{2}$	25.2	24.7	24.0	23.2	22.2	21.0	19.8	18.4	16.8	14.0	
5 x 3 x $\frac{3}{8}$	16.8	16.2	15.5	14.5	13.4	12.2	10.9	9.6	8.5	..	
" " $\frac{1}{2}$	21.9	21.2	20.2	18.9	17.5	15.8	14.0	12.4	10.9	..	
4 x 4 x $\frac{1}{2}$	16.7	16.2	15.4	14.4	13.3	12.0	10.7	9.4	8.3	..	
" " $\frac{5}{8}$	21.9	21.2	20.2	19.0	17.6	16.0	14.2	12.6	11.1	..	
4 x 3 x $\frac{3}{8}$	14.6	14.1	13.6	12.8	11.9	10.9	9.8	8.7	7.8	..	
" " $\frac{1}{2}$	19.0	18.4	17.6	16.6	15.5	14.2	12.7	11.2	9.9	..	
3½ x 3½ x $\frac{3}{8}$	14.4	13.8	12.9	11.9	10.7	9.3	8.1	7.0	..	..
" " $\frac{1}{2}$	18.9	18.1	17.0	15.7	14.2	12.5	10.8	9.4	..	..
3 x 3 x $\frac{3}{8}$	12.1	11.4	10.4	9.3	8.0	6.8	5.7	..	..	..
" " $\frac{1}{2}$	15.8	14.9	13.7	12.3	10.7	9.1	7.7	..	..	..
3 x 2½ x $\frac{3}{8}$	11.0	10.5	9.7	8.7	7.6	6.5	5.6	..	..	..
" " $\frac{1}{2}$	14.4	13.7	12.7	11.5	10.1	8.7	7.4	..	..	..
2½ x 2½ x $\frac{1}{4}$	6.7	6.1	5.3	4.4	3.6	..	..	..	..	..
" " $\frac{3}{8}$	8.2	7.5	6.6	5.5	4.5	..	..	..	..	..
" " $\frac{5}{8}$	9.7	8.9	7.9	6.6	5.4	..	..	..	..	..
2½ x 2½ x $\frac{1}{4}$	5.9	5.2	4.4	3.6	2.8	..	..	..	..	..
" " $\frac{3}{8}$	8.6	7.7	6.6	5.4	4.3	..	..	..	..	..
2 x 2 x $\frac{1}{4}$	5.1	4.4	3.5	2.7	..	..	..	..	..	..
" " $\frac{3}{8}$	7.4	6.5	5.3	4.1	..	..	..	..	..	..
2 x 1½ x $\frac{1}{4}$	4.4	3.9	3.2	2.5	..	..	..	..	..	..
" " $\frac{3}{8}$	6.3	5.5	4.5	3.5	..	..	..	..	..	..
1½ x 2 x $\frac{1}{4}$	3.9	2.9	..	..	..	..	..	..	..	..
" " $\frac{3}{8}$	4.8	3.6	..	..	..	..	..	..	..	..
1½ x 1½ x $\frac{1}{4}$	4.3	3.5	2.7	..	..	..	..	..	..	..
" " $\frac{3}{8}$	5.2	4.4	3.4	..	..	..	..	..	..	..
1½ x 1½ x $\frac{1}{4}$	3.4	2.6	1.9	..	..	..	..	..	..	..

DORMAN, LONG & CO. LIMITED.

ANGLES AS STRUTS. SAFE LOADS IN TONS FOR SINGLE UNEQUAL ANGLES. 'ENDS FIXED.

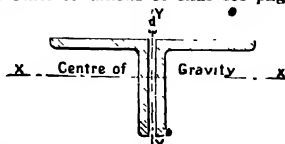
For other conditions of ends see page 65.

c	Size and Thickness	LENGTH IN FEET									
		2	3	4	5	6	7	8	9	10	12
	7 × 3½ × 5/16	35.7	34.3	32.3	29.8	27.0	23.8	20.7	18.1	..	..
	" " × 3/8	42.3	40.5	38.1	35.1	31.7	27.8	24.2	21.0	..	..
	6½ × 4½ × 5/8	38.0	37.1	35.8	34.2	32.3	30.2	27.8	25.2	22.7	18.3
	" " × 3/4	45.1	44.0	42.5	40.6	38.3	35.8	33.0	29.9	26.9	21.7
	6 × 4 × 1/2	27.7	26.9	25.8	24.3	22.6	20.7	18.6	16.5	14.7	..
	" " × 5/8	34.2	33.2	31.8	30.0	27.9	25.6	22.9	20.4	18.1	..
	6 × 3½ × 1/2	26.1	25.1	23.6	21.9	19.9	17.6	15.3	13.4	11.7	..
	" " × 5/8	32.2	30.9	29.1	27.0	24.5	21.7	18.9	16.5	14.4	..
	6 × 3 × 1/2	24.3	22.9	21.1	18.9	16.3	13.9	11.7	..	..	..
	" " × 5/8	29.9	28.3	25.9	23.3	20.1	17.1	14.5	..	..	..
	5½ × 3½ × 1/2	24.6	23.7	22.3	20.7	18.8	16.6	14.5	12.6	11.0	..
	" " × 5/8	30.3	29.1	27.5	25.4	23.1	20.4	17.8	15.6	13.6	..
	5½ × 3 × 1/2*	22.9	21.7	20.0	18.0	15.6	13.3	11.3	..	..	..
	" " × 5/8*	28.2	26.6	24.4	21.9	18.9	16.1	13.6	..	..	..
	5 × 4 × 1/2	24.3	24.0	22.9	21.6	20.0	18.3	16.3	14.4	12.8	..
	" " × 5/8	30.5	29.5	28.2	26.5	24.5	22.3	19.8	17.5	15.5	..
	5 × 3½ × 1/2	23.2	22.3	21.6	19.5	17.7	15.6	13.6	11.9	10.4	..
	" " × 5/8	28.5	27.3	25.7	23.8	21.6	19.0	16.5	14.4	12.5	..
	5 × 3 × 1/2	21.5	20.3	18.2	16.8	14.6	12.4	10.6	..	..	..
	" " × 5/8	26.4	24.9	23.0	20.7	17.9	15.3	13.0	..	..	..
	4½ × 3½ × 1/2*	21.7	20.8	19.6	13.1	16.4	14.4	12.6	11.0	..	..
	" " × 5/8*	26.7	25.6	24.1	22.3	20.2	17.8	15.5	13.5	..	..
	4 × 3 × 3/4	14.2	13.5	12.4	11.1	9.7	8.2	7.0	..	..	..
	" " × 5/8	18.6	17.5	16.1	14.4	12.5	10.6	9.0	..	..	..
	" " × 3/4	22.8	21.5	19.7	17.7	15.3	13.0	11.0	..	..	..
	3½ × 3 × 1/2	11.0	10.4	9.5	8.5	7.3	6.2	5.2	..	..	..
	" " × 5/8	13.1	12.4	11.3	10.1	8.7	7.4	6.2	..	..	..
	" " × 3/4	17.1	16.1	14.7	13.0	11.1	9.4	8.0	..	..	..
	" " × 5/8	20.9	19.7	18.0	16.0	13.6	11.5	9.7	..	..	..
	3½ × 2½ × 1/2	10.0	9.2	8.2	7.0	5.8	4.8	..	..	..	..
	" " × 5/8	11.8	10.9	9.7	8.2	6.7	5.5	..	..	..	..
	" " × 3/4	15.4	14.2	12.6	10.6	8.8	7.2	..	..	..	..
	3 × 2½ × 1/2	7.3	6.7	5.9	5.0	4.1	..	..	..	..	..
	" " × 5/8	10.7	9.9	8.7	7.3	6.0	..	..	..	..	..
	" " × 3/4	14.0	12.8	11.3	9.5	7.8	..	..	..	..	..
	3 × 2 × 1/2	6.4	5.7	4.7	3.7	..	..	..	..	..	..
	" " × 5/8	9.4	8.2	6.6	5.2	..	..	..	..	..	..
	" " × 3/4	12.1	10.6	8.6	6.7	..	..	..	..	..	..
	2½ × 2 × 1/2	5.7	5.0	4.1	3.2	..	..	..	..	..	..
	" " × 5/8	7.1	6.2	5.0	3.9	..	..	..	..	..	..
	" " × 3/4	8.3	7.3	5.9	4.6	..	..	..	..	..	..
	2 × 1½ × 1/2	3.1	2.4	1.8	..	..	..	..	..	..	..
	" " × 5/8	4.0	3.1	2.2	..	..	..	..	..	..	..
	" " × 3/4	4.9	3.8	2.7	..	..	..	..	..	..	..

DORMAN, LONG & CO. LIMITED.

ANGLES AS STRUTS. SAFE LOADS IN TONS FOR TWO EQUAL ANGLES. ENDS FIXED.

For other conditions of ends see page 65.



Size and Thickness	d	Radii of Gyration		LENGTH IN FEET											
		xx	yy	2	3	4	5	6	8	10	12	16	20		
8 x 8 x 5/8	5/8	2.46	3.52	114.8	114.4	113.7	112.9	112.0	109.6	105.7	103.2	94.4	84.0		
" " x 5/8	5/8	2.45	3.54	136.7	136.1	135.3	134.4	133.3	130.4	126.9	122.6	112.1	99.7		
6 x 6 x 1/2	1/2	1.84	2.70	68.6	68.1	67.4	66.6	65.6	63.2	60.1	56.4	47.8	38.4		
" " x 3/4	3/4	1.83	2.73	84.8	84.1	83.3	82.3	81.0	78.0	74.1	69.6	58.8	47.2		
" " x 3/4	3/4	1.81	2.75	100.6	99.8	98.8	97.6	96.1	92.5	87.7	82.2	69.2	55.3		
5 x 5 x 1/2	1/2	1.52	2.26	56.5	55.9	55.1	54.1	53.0	50.0	46.4	42.3	32.9	..		
" " x 3/4	3/4	1.51	2.29	69.7	68.9	67.9	66.7	65.3	61.6	57.1	52.0	40.2	..		
4 1/2 x 4 1/2 x 1 1/2	1 1/2	1.36	2.05	50.4	49.8	48.9	47.8	46.6	43.3	39.5	34.9	25.9	..		
" " x 1 1/2	1 1/2	1.35	2.09	62.1	61.3	60.2	58.9	57.3	53.2	48.4	42.7	31.6	..		
4 x 4 x 3/4	3/4	1.22	1.83	33.8	33.3	32.6	31.7	30.6	28.0	24.8	21.2	..	..
" " x 3/4	3/4	1.21	1.86	44.3	43.7	42.7	41.5	40.1	36.6	32.4	27.6	..	..
" " x 3/4	3/4	1.19	1.89	54.5	53.6	52.4	50.9	49.1	44.6	39.4	33.3	..	..
3 1/2 x 3 1/2 x 1 1/4	1 1/4	1.07	1.53	24.7	24.1	23.5	22.6	21.6	19.2	16.3	13.5	..	..
" " x 1 1/4	1 1/4	1.06	1.59	29.3	28.7	27.9	26.9	25.6	22.7	19.2	15.9	..	..
" " x 1 1/4	1 1/4	1.05	1.62	38.3	37.5	36.4	35.1	33.4	29.6	24.9	20.5	..	..
" " x 1 1/4	1 1/4	1.04	1.64	46.9	45.9	44.6	42.9	40.9	36.1	30.2	24.8	..	..
3 x 3 x 1 1/4	1 1/4	.92	1.37	16.9	16.4	15.8	15.0	14.1	12.0	9.6	..	..	..
" " x 1 1/4	1 1/4	.90	1.40	24.7	24.0	23.1	21.9	20.5	17.2	13.8	..	..	..
" " x 1 1/4	1 1/4	.89	1.43	32.2	31.3	30.1	28.5	26.6	22.2	17.7	..	..	..
" " x 1 1/4	1 1/4	.88	1.45	39.5	38.2	36.6	34.6	32.4	26.9	21.3	..	..	..
2 1/2 x 2 1/2 x 1 1/2	1 1/2	.76	1.17	13.8	13.2	12.5	11.6	10.6	8.2	..	..	..	..
" " x 1 1/2	1 1/2	.75	1.13	17.0	16.3	15.4	14.2	12.9	10.0	..	..	..	..
" " x 1 1/2	1 1/2	.75	1.20	20.1	19.3	18.2	16.8	15.3	11.8	..	..	..	..
" " x 1 1/2	1 1/2	.73	1.23	26.0	24.9	23.4	21.6	19.5	14.9	..	..	..	..
2 1/4 x 2 1/4 x 1 1/4	1 1/4	.68	1.05	9.3	8.9	8.2	7.5	6.6	4.9	..	..	..	..
" " x 1 1/4	1 1/4	.68	1.07	12.2	11.6	10.8	9.9	8.7	6.5	..	..	..	..
" " x 1 1/4	1 1/4	.67	1.09	15.0	14.3	13.3	12.1	10.6	7.8	..	..	..	..
" " x 1 1/4	1 1/4	.67	1.10	17.8	16.9	15.7	14.2	12.5	9.3	..	..	..	..
2 x 2 x 3/4	3/4	.60	.96	8.1	7.6	6.9	6.1	5.2	..	..	..	..	..
" " x 3/4	3/4	.60	.97	10.7	10.0	9.1	8.1	6.8	..	..	..	..	..
" " x 3/4	3/4	.59	.99	13.1	12.3	11.1	9.8	8.3	..	..	..	..	..
" " x 3/4	3/4	.59	1.00	15.4	14.5	13.1	11.5	9.8	..	..	..	..	..
1 3/4 x 1 3/4 x 3/4	3/4	.58	.86	7.0	6.4	5.7	4.8	4.0	..	..	..	..	..
" " x 3/4	3/4	.52	.88	9.1	8.4	7.4	6.2	5.1	..	..	..	..	..
" " x 3/4	3/4	.51	.89	11.1	10.2	8.9	7.4	6.1	..	..	..	..	..
1 1/2 x 1 1/2 x 3/8	3/8	.45	.77	5.8	5.1	4.3	3.4	..	..	..	..	..	..
" " x 3/8	3/8	.44	.78	7.5	6.6	5.5	4.4	..	..	..	..	..	..
" " x 3/8	3/8	.44	.80	9.1	8.1	6.7	5.3	..	..	..	..	..	..
1 1/4 x 1 1/4 x 3/8	3/8	.37	.67	4.5	3.8	2.9	..	..	..	..	..	..	..
" " x 3/8	3/8	.36	.69	5.8	4.8	3.7	..	..	..	..	..	..	..

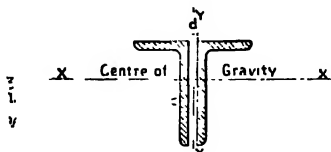
DCRMAN, LONG & CO. LIMITED.

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR TWO UNEQUAL ANGLES.

ENDS FIXED.

For other conditions of ends see page 65.



Size and Thickness	d	Radii of Gyration		LENGTH IN FEET																
		xx	yy	2	3	4	5	6	8	10	12	14	16	18	20					
7 × 3½ × ½	5/16	2.24	1.42	59.3	53.7	57.7	56.5	55.2	51.7	47.4	42.5	37.0	32.1	27.7	23.7	..	..	..	..	..
" " 5/16	3/4	2.22	1.45	73.3	72.5	71.4	69.9	68.3	64.2	59.1	53.4	47.0	40.8	34.5	28.1	..	..	..	..	..
" " 3/8	5/8	2.21	1.43	86.9	85.9	84.7	83.1	81.2	77.0	71.4	65.4	58.9	51.8	44.2	36.1	..	..	..	..	..
6½ × 4½ × ½	3/8	2.06	1.31	62.6	62.2	61.6	60.9	60.1	55.3	50.5	45.2	39.4	33.1	26.8	20.5	..	..	..	..	..
" " 5/16	3/4	2.04	1.34	77.1	76.8	76.1	75.3	74.3	68.7	63.4	57.6	51.3	44.5	37.1	29.6	..	..	..	..	..
" " 3/8	5/8	2.03	1.36	91.7	91.1	90.3	89.3	88.2	82.5	76.1	69.2	61.8	53.9	45.4	36.3	..	..	..	..	..
6½ × 3½ × 3/8	1/2	2.09	1.37	42.3	42.3	41.6	40.7	39.9	36.4	33.6	29.8	26.1	22.5	18.9	15.3	..	..	..	..	..
" " 5/16	1/2	2.07	1.40	55.4	55.7	54.8	53.6	52.3	48.4	44.7	39.9	35.2	30.5	25.8	21.1	..	..	..	..	..
" " 3/8	3/4	2.06	1.43	69.6	68.7	67.7	66.3	64.7	60.7	55.8	50.1	43.4	36.7	29.0	21.3	..	..	..	..	..
6 × 4 × 3/8	1/2	1.91	1.64	43.0	42.6	42.1	41.4	40.6	36.8	33.6	29.8	26.1	22.5	18.9	15.3	..	..	..	..	..
" " 5/16	1/2	1.90	1.67	56.6	56.1	55.4	54.6	53.6	49.4	45.7	40.8	36.1	31.4	26.7	22.0	..	..	..	..	..
" " 3/8	3/4	1.88	1.69	69.8	69.2	68.4	67.4	66.2	61.9	57.5	51.8	46.1	40.4	34.7	28.9	..	..	..	..	..
6 × 3½ × 3/8	1/2	1.92	1.41	40.6	40.2	39.5	38.7	37.7	33.5	30.2	26.5	22.8	19.1	15.4	11.7	..	..	..	..	..
" " 5/16	1/2	1.91	1.44	53.5	52.9	52.0	51.0	49.9	45.7	41.9	37.1	32.4	27.7	23.0	18.3	..	..	..	..	..
" " 3/8	3/4	1.89	1.47	66.9	66.2	65.4	64.2	63.0	58.7	54.3	48.5	42.8	37.1	31.4	25.7	..	..	..	..	..
6 × 3 × 3/8	1/2	1.93	1.19	38.3	37.7	36.8	35.7	34.5	31.3	27.7	23.9	20.1	16.4	12.7	9.0	..	..	..	..	..
" " 5/16	1/2	1.91	1.22	50.3	49.5	48.5	47.1	45.5	41.3	37.5	32.7	27.9	23.2	18.5	13.8	..	..	..	..	..
" " 3/8	3/4	1.89	1.25	62.0	61.1	59.8	58.3	56.5	52.3	47.5	42.8	37.1	31.4	25.7	20.0	..	..	..	..	..
5½ × 3½ × 3/8	1/2	1.75	1.45	38.4	38.0	37.4	36.7	35.8	32.6	29.0	25.2	21.5	17.8	14.1	10.4	..	..	..	..	..
" " 5/16	1/2	1.73	1.48	50.5	50.0	49.2	48.3	47.2	43.0	39.3	35.5	31.7	27.9	24.1	20.3	..	..	..	..	..
" " 3/8	3/4	1.73	1.50	62.2	61.6	60.7	59.6	58.3	54.0	50.2	46.4	42.6	38.8	34.9	31.1	..	..	..	..	..
5½ × 3 × 3/8	1/2	1.76	1.22	36.1	35.5	34.8	33.8	32.7	29.5	25.8	22.0	18.3	14.6	10.9	7.2	..	..	..	..	..
" " 5/16	1/2	1.75	1.25	47.4	46.7	45.7	44.4	43.1	38.9	35.1	31.3	27.5	23.7	19.9	16.1	..	..	..	..	..
" " 3/8	3/4	1.73	1.28	58.3	57.5	56.4	55.0	53.3	49.1	44.3	39.5	34.7	30.0	25.2	20.5	..	..	..	..	..
5 × 4 × 3/8	1/2	1.57	1.73	38.5	38.1	37.6	37.0	36.2	33.4	30.0	26.5	23.0	19.5	16.0	12.5	..	..	..	..	..
" " 5/16	1/2	1.56	1.76	50.6	50.1	49.4	48.6	47.6	43.8	40.3	36.7	33.1	29.5	25.9	22.3	..	..	..	..	..
" " 3/8	3/4	1.54	1.79	62.3	61.6	60.8	59.7	58.5	54.7	50.9	47.2	43.5	39.8	36.1	32.4	..	..	..	..	..
5 × 3½ × 3/8	1/2	1.58	1.45	36.2	35.9	35.3	34.7	33.9	31.1	27.5	23.8	20.1	16.4	12.7	9.0	..	..	..	..	..
" " 5/16	1/2	1.57	1.52	47.6	47.1	46.4	45.6	44.6	40.8	37.1	33.4	29.7	26.0	22.3	18.6	..	..	..	..	..
" " 3/8	3/4	1.55	1.55	58.6	58.0	57.2	56.2	55.1	51.2	47.5	43.8	40.1	36.4	32.7	29.0	..	..	..	..	..

DORMAN, LONG & CO. LIMITED.

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR TWO UNEQUAL ANGLES.

ENDS FIXED.

For other conditions of ends see page 65.

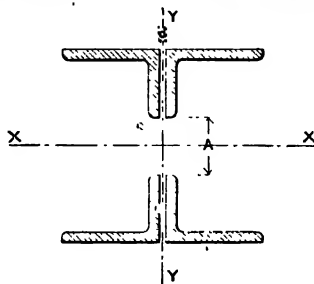
Size and Thickness	d	Radii of Gyration		LENGTH IN FEET									
		xx	yy	2	3	4	5	6	8	10	12	14	16
5 x 3 x $\frac{5}{16}$	$\frac{1}{2}$	1.60	1.24	23.4	28.0	27.4	26.7	25.8	23.7	21.1	18.1	15.4	13.0
" " $\frac{3}{8}$	$\frac{1}{2}$	1.59	1.26	35.8	33.4	32.6	31.9	30.8	28.3	25.4	21.9	18.6	15.8
" " $\frac{1}{2}$	$\frac{1}{2}$	1.58	1.29	44.4	43.8	43.0	41.9	40.7	37.5	33.8	29.4	25.1	21.4
" " $\frac{5}{8}$	$\frac{1}{2}$	1.56	1.32	54.6	53.9	52.9	51.7	50.2	46.5	42.1	36.9	31.6	27.1
4 $\frac{1}{2}$ x 3 $\frac{1}{2}$ x $\frac{5}{16}$	$\frac{1}{2}$	1.42	1.52	23.5	28.2	27.7	27.2	25.5	24.8	22.8	20.4	17.8	15.4
" " $\frac{3}{8}$	$\frac{1}{2}$	1.41	1.53	33.9	33.5	33.0	32.3	31.5	29.5	27.0	24.2	21.0	18.2
" " $\frac{1}{2}$	$\frac{1}{2}$	1.40	1.56	41.5	44.0	43.2	42.3	41.3	38.6	35.3	31.5	27.3	23.6
" " $\frac{5}{8}$	$\frac{1}{2}$	1.38	1.59	54.7	54.0	53.1	51.9	50.6	47.2	43.1	38.3	33.1	28.6
4 x 3 $\frac{1}{2}$ x $\frac{5}{16}$	$\frac{1}{2}$	1.24	1.57	26.6	26.2	25.6	25.0	24.2	22.1	19.7	16.9	14.4	..
" " $\frac{3}{8}$	$\frac{1}{2}$	1.24	1.58	31.6	31.1	30.5	29.7	28.7	26.3	23.5	20.1	17.1	..
" " $\frac{1}{2}$	$\frac{1}{2}$	1.22	1.61	41.4	40.9	40.3	39.8	37.5	34.2	30.4	26.0	22.0	..
" " $\frac{5}{8}$	$\frac{1}{2}$	1.21	1.64	50.3	50.0	49.3	47.6	45.9	41.9	37.1	31.6	26.7	..
4 x 3 x $\frac{5}{16}$	$\frac{1}{2}$	1.26	1.32	24.8	24.4	23.9	23.3	22.6	20.7	18.6	16.0	13.6	..
" " $\frac{3}{8}$	$\frac{1}{2}$	1.25	1.34	29.4	29.0	28.4	27.7	26.8	24.6	22.0	18.9	16.0	..
" " $\frac{1}{2}$	$\frac{1}{2}$	1.24	1.37	38.5	37.9	37.1	36.1	35.0	32.0	28.6	24.5	20.8	..
" " $\frac{5}{8}$	$\frac{1}{2}$	1.22	1.40	47.1	46.4	45.4	44.2	42.7	39.0	34.6	29.6	25.0	..
3 $\frac{1}{2}$ x 3 x $\frac{5}{16}$	$\frac{1}{2}$	1.03	1.32	22.5	22.3	21.7	21.3	20.1	17.9	15.2	12.6	..	..
" " $\frac{3}{8}$	$\frac{1}{2}$	1.03	1.34	27.1	26.6	25.8	24.9	23.8	21.2	18.1	15.0	..	..
" " $\frac{1}{2}$	$\frac{1}{2}$	1.06	1.37	35.4	34.6	33.7	32.4	31.0	27.5	23.2	19.1	..	..
" " $\frac{5}{8}$	$\frac{1}{2}$	1.05	1.40	43.7	42.3	41.2	39.6	37.8	33.4	28.1	23.2	..	..
3 $\frac{1}{2}$ x 2 $\frac{1}{2}$ x $\frac{5}{16}$	$\frac{1}{2}$	1.10	1.03	21.0	20.6	20.0	19.3	18.5	17.4	14.0	11.6	..	..
" " $\frac{3}{8}$	$\frac{1}{2}$	1.09	1.10	24.9	24.4	23.8	23.0	22.0	19.6	16.7	13.9	..	..
" " $\frac{1}{2}$	$\frac{1}{2}$	1.03	1.13	32.5	31.8	30.9	29.9	28.6	25.4	21.7	17.9	..	..
3 x 2 $\frac{1}{2}$ x $\frac{5}{16}$	$\frac{1}{2}$	.93	1.12	15.4	15.0	14.4	13.7	12.9	11.0	8.9	..	..	..
" " $\frac{3}{8}$	$\frac{1}{2}$	.92	1.15	22.5	21.9	21.1	20.1	18.8	16.0	12.8	..	..	..
" " $\frac{1}{2}$	$\frac{1}{2}$	.91	1.17	29.3	28.5	27.4	26.0	24.4	20.6	16.5	..	..	..
3 x 2 x $\frac{5}{16}$	$\frac{1}{2}$	.94	.87	13.9	13.5	12.9	12.2	11.4	9.4	7.4	..	..	..
" " $\frac{3}{8}$	$\frac{1}{2}$	.93	.91	20.3	19.7	19.0	18.0	16.5	14.3	11.4	..	..	..
" " $\frac{1}{2}$	$\frac{1}{2}$	.92	.94	26.4	25.7	24.7	23.5	22.1	18.7	15.0	..	..	..
2 $\frac{1}{2}$ x 2 x $\frac{5}{16}$	$\frac{1}{2}$	.77	.92	12.3	11.9	11.2	10.4	9.6	7.5	..	..	..	..
" " $\frac{3}{8}$	$\frac{1}{2}$	.77	.94	15.2	14.6	13.8	12.9	11.8	9.2	..	..	..	..
" " $\frac{1}{2}$	$\frac{1}{2}$	.76	.95	17.9	17.3	16.3	15.1	13.8	10.7	..	..	..	..
2 x 1 $\frac{1}{2}$ x $\frac{5}{16}$	$\frac{3}{8}$	.62	.71	7.1	6.7	6.1	5.5	4.7	..	..	..	..	..
" " $\frac{3}{8}$	$\frac{3}{8}$	.62	.73	9.3	8.8	8.0	7.2	6.1	..	..	..	..	..
" " $\frac{1}{2}$	$\frac{3}{8}$	.61	.75	11.4	10.7	9.8	8.7	7.4	..	..	..	..	..

DORMAN, LONG & CO. LIMITED.

ANGLES AS STRUTS.

SAFE LOADS IN TONS FOR FOUR UNEQUAL ANGLES LACED.
ENDS FIXED.

For other conditions of ends see page 35.

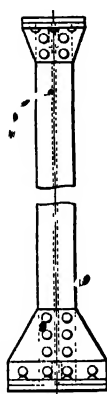
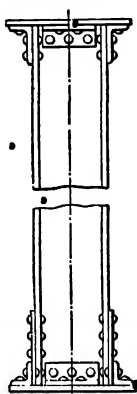
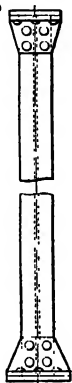
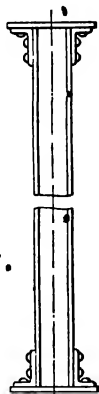


For the Sections given, the least radius of Gyration will be about $\frac{1}{10}$ of Y , as, for this to be otherwise the distance A would have to be less than $\frac{1}{10}$ of Y .

Size and Thickness	d	Radius of Gyration	LENGTH IN FEET											
			6	8	10	12	14	16	18	20	22	24	26	
			v	v	v	v	v	v	v	v	v	v	v	
6 × 4 × 1/2	1/2	2.91	111.6	109.9	107.7	105.2	102.3	98.9	95.1	91.2	86.9	82.2	77.1	
" " 5/8	5/8	2.95	137.7	135.7	133.1	130.1	126.5	122.4	117.9	113.1	108.0	102.4	96.3	
6 × 3 1/2 × 1/2	1/2	3.00	105.9	104.4	102.4	100.2	97.6	94.5	91.1	87.5	83.7	79.5	..	
" " 5/8	5/8	3.03	130.6	128.7	126.4	123.7	120.5	116.8	112.7	108.3	103.7	98.7	..	
5 1/2 × 3 1/2 × 1/2	1/2	2.72	99.6	97.9	95.7	93.2	90.1	86.7	82.9	78.9	74.6	69.8	..	
" " 5/8	5/8	2.76	122.7	120.6	118.0	115.0	111.4	107.3	102.7	97.9	92.7	87.0	..	
5 × 4 × 3/8	3/8	2.36	75.3	73.5	71.4	68.8	65.8	62.5	58.9	54.9	50.6	46.4	42.6	
" " 1/2	1/2	2.39	99.0	96.7	94.0	90.7	86.8	82.5	77.9	72.9	67.3	61.8	56.7	
" " 5/8	5/8	2.41	121.9	119.2	115.9	111.9	107.2	102.0	96.4	90.3	83.5	76.7	70.5	
5 × 3 1/2 × 3/8	3/8	2.43	71.0	69.5	67.6	65.3	62.6	59.6	56.4	52.9	49.0	45.0	..	
" " 1/2	1/2	2.46	93.3	91.3	88.9	85.9	82.5	78.6	74.5	70.0	65.0	59.9	..	
" " 5/8	5/8	2.49	114.9	112.5	109.6	106.0	101.8	97.2	92.2	86.8	80.8	74.6	..	
5 × 3 × 3/8	3/8	2.50	66.7	65.3	63.6	61.6	59.2	56.5	53.7	50.5	..	..	..
" " 1/2	1/2	2.53	87.5	85.8	83.6	81.0	77.9	74.4	70.8	66.8	..	..	..
" " 5/8	5/8	2.56	107.6	105.6	103.0	99.8	96.1	91.9	87.5	82.7	..	..	..
4 1/2 × 3 1/2 × 3/8*	3/8*	2.16	66.1	64.3	62.1	59.3	56.2	52.9	49.1	45.0	41.0	37.3	..	
" " 1/2*	1/2*	2.19	86.7	84.4	81.6	78.1	74.1	69.8	65.1	59.7	54.5	49.6	..	
" " 5/8*	5/8*	2.21	106.7	103.9	100.5	96.1	91.4	86.2	80.5	74.0	67.5	61.6	..	
4 × 3 × 1/2	1/2	1.95	48.0	46.4	44.4	41.9	39.3	36.3	33.0	29.7	..	..	..
" " 5/8	5/8	1.97	57.0	55.2	52.9	50.0	46.9	43.5	39.6	35.7	..	..	..
" " 1/2	1/2	1.99	74.7	72.3	69.3	65.7	61.7	57.3	52.2	47.2	..	..	..
" " 5/8	5/8	2.02	91.6	88.9	85.3	80.9	76.2	70.9	64.9	58.7	..	..	..
3 1/2 × 3 × 1/2	1/2	1.64	43.5	41.5	38.9	36.0	32.6	28.9	25.5	22.5	..	..	..
" " 5/8	5/8	1.66	51.8	49.5	46.4	43.0	39.1	34.8	30.8	27.2	..	..	..
" " 1/2	1/2	1.68	67.8	64.8	60.9	56.6	51.6	46.0	40.7	36.0	..	..	..
" " 5/8	5/8	1.71	83.1	79.5	75.0	69.8	63.9	57.2	50.8	45.0	..	..	..

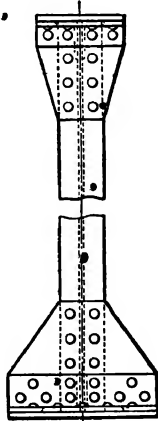
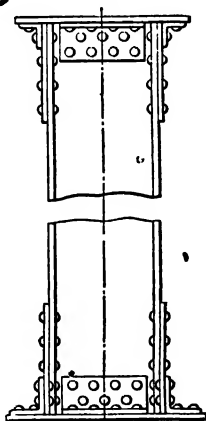
DORMAN, LONG & CO. LIMITED.

**TYPES OF BASES & CAPS FOR
STANCHIONS**



FOR SMALL I BEAMS.

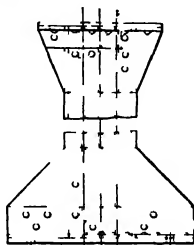
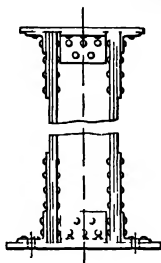
FOR MEDIUM I BEAMS.



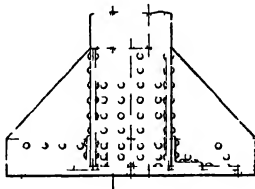
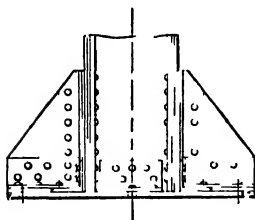
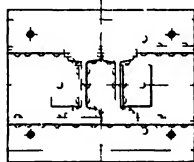
FOR LARGE I BEAMS.

DORMAN, LONG & CO. LIMITED.

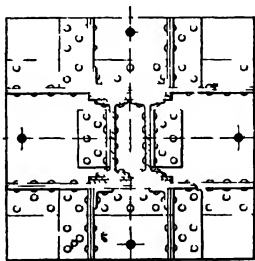
TYPES OF BASES & CAPS FOR STANCHIONS



FOR DOUBLE I BEAMS
WITH FLATS.
MEDIUM TYPE.

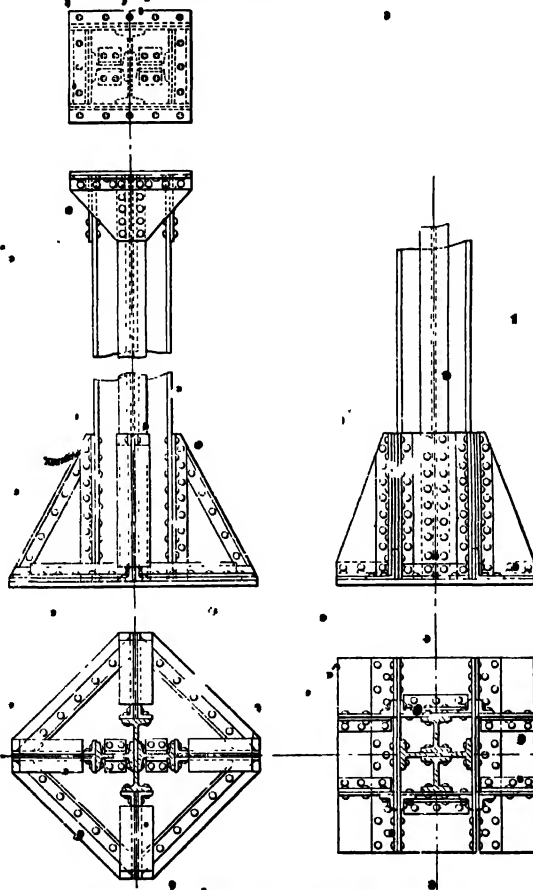


FOR DOUBLE I BEAMS
WITH FLATS.
LARGE TYPE.



DORMAN, LONG & CO. LIMITED.

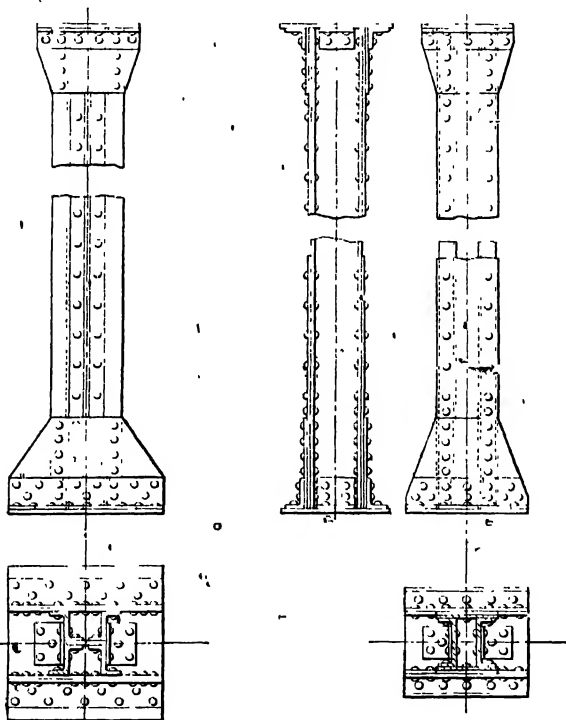
TYPES OF BASES & CAPS FOR STANCHIONS



FOR 1 BEAMS OF CRUCIFORM SECTION.

DORMAN, LONG & CO. LIMITED.

TYPES OF BASES & CAPS FOR STANCHIONS

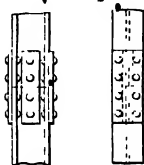


FOR ZED BARS WITH FLATS.

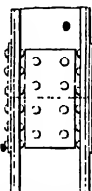
FOR CHANNELS WITH FLATS.

DORMAN, LONG & CO. LIMITED.

TYPES OF JOINTS FOR STANCHIONS



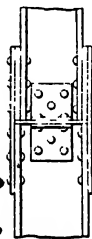
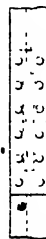
FOR SINGLE I BEAMS.



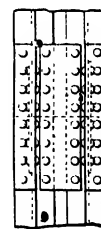
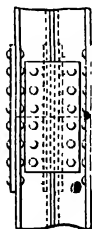
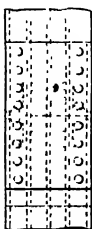
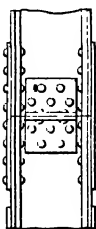
FOR SINGLE I BEAMS WITH FLATS.



FOR LARGER I BEAMS.



FOR BEAMS OF DIFFERENT SIZES.



FOR DOUBLE I BEAMS
WITH FLATS.

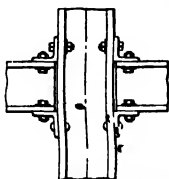


FOR ZED BAR TYPE.

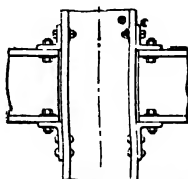
Bolted Connections may be adopted to facilitate erection if found advisable.

DORMAN, LONG & CO. LIMITED.

TYPE CONNECTIONS OF I BEAMS TO BEAM STANCHIONS



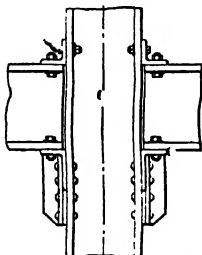
Flange Connections.



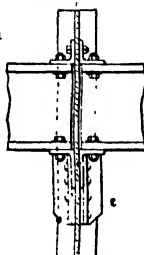
Flange Connections.



SIMPLE ANGLE STOLLS AND TOP CLEATS FOR I BEAMS.



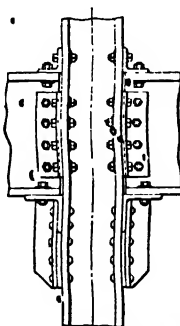
Flange Connections



Web Connections



BUILT STOLLS AND TOP CLEATS FOR I BEAMS



Flange Connections.

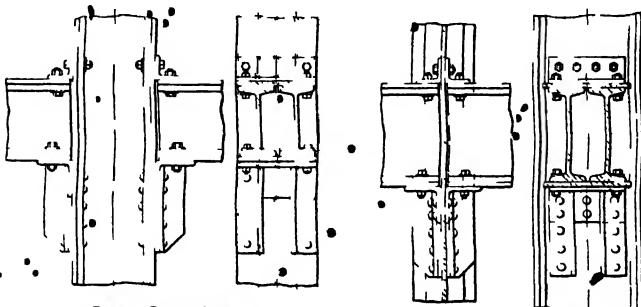


BUILT STOLLS, SIDE AND TOP CLEATS FOR I BEAMS.

(where greater rigidity is required)

DORMAN, LONG & CO LIMITED

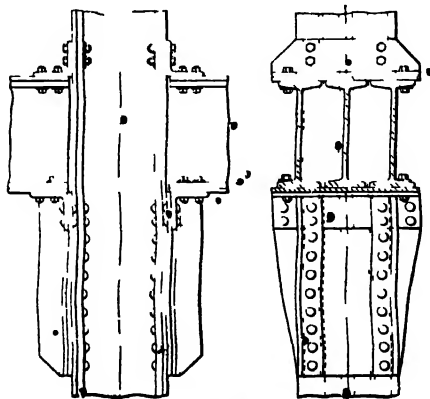
TYPE CONNECTIONS OF I BEAM COMPOUNDS TO BEAM COMPOUND STANCHIONS



Flange Connections

Web Connections

BUILT STOOLS AND TOP CLEATS FOR I BEAM COMPOUNDS

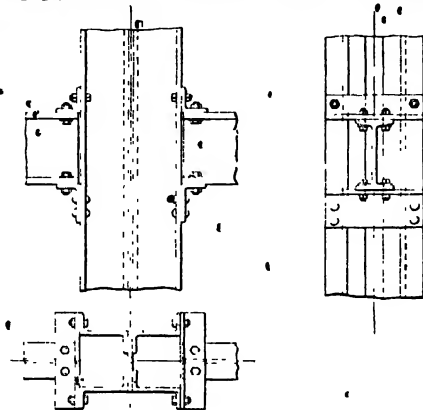


Flange Connections

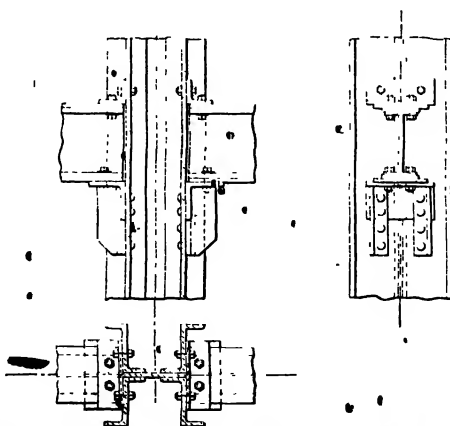
GUSSETED STOOLS AND TOP CLEATS FOR I BEAM COMPOUNDS

DURMAN, LONG & CO. LIMITED.

TYPE CONNECTIONS OF I BEAMS AND COMPOUNDS TO ZED BAR STANCHIONS



SIMPLE ANGLE STOOLS AND TOP CLEATS FOR I BEAMS.



BUILT STOOLS AND TOP CLEATS FOR I BEAM COMPOUNDS.

STANDARD CONNECTIONS FOR BEAMS.

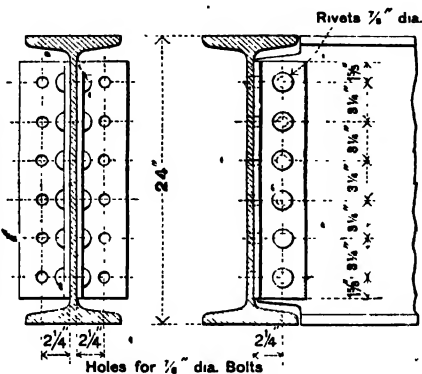
Standard Angle Cleats.—The standard angle cleats, illustrated on pages 100 to 103, have been designed for bolted field connections. They have been calculated to withstand reactions equivalent to those produced by the tabular loads on the beams, at the minimum spans given with each standard connection.

Where the reactions are greater than the above, additional support, or special connection, will be necessary.

Separators.—When two or more beams are required to be bolted together, side by side, to form a girder, cast iron separators are frequently used. They should be placed at intervals of about five or six feet, and where concentrated loads occur.

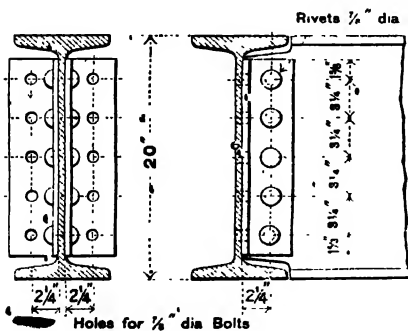
DORMAN, LONG & CO. LIMITED.

STANDARD CONNECTIONS FOR BEAMS



For
B.S.B 24" x 7 1/2" x 100 lbs
Min Span 22'-0"

ANGLE CLEATS 4" x 4" x 1/2" x 1'-7 1/2" LONG. REF. NO. L¹

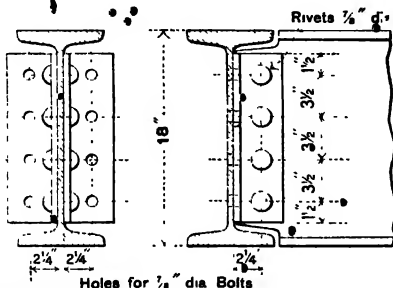


For
B.S.B 20" x 7 1/2" x 89 lbs
Min Span 19'-0"

ANGLE CLEATS 4" x 4" x 1/2" x 1'-4 1/4" LONG. REF. NO. L²

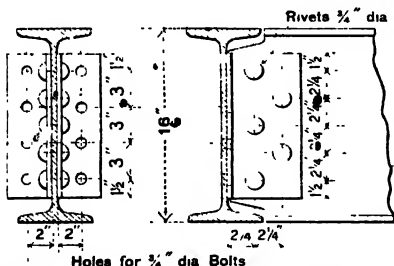
DORMAN, LONG & CO. LIMITED.

STANDARD CONNECTIONS FOR BEAMS



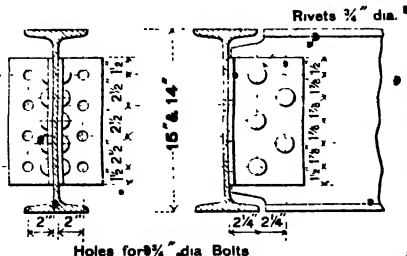
For
B.S.B. 18" x 7" x 75 lbs
Min. Span 18'-0"

ANGLE CLEATS 4" x 4" x 1/2" x 1-1/2" LONG. REF. NO. L3



For
B.S.B. 18" x 8" x 62 lbs
Min Span 18'-0"

ANGLE CLEATS 6" x 3-1/2" x 3/8" x 1'-0" LONG. REF. NO. L4

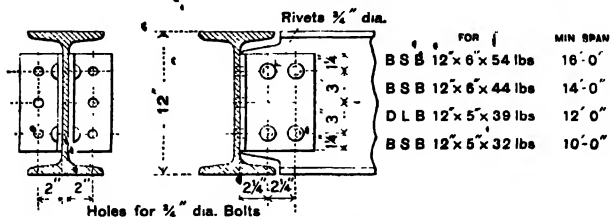
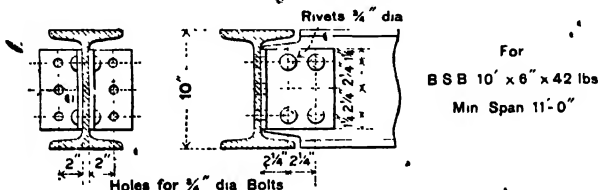
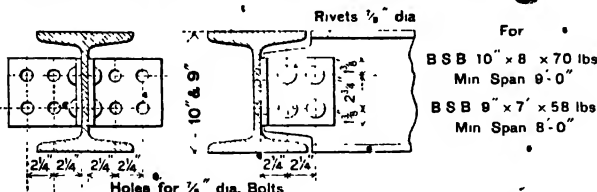
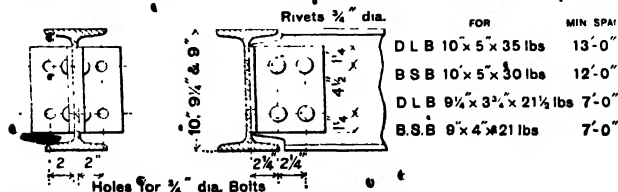


For
B.S.B. 15" x 8" x 59 lbs
Min Span 16'-0"
B.S.B. 15" x 6" x 42 lbs
Min Span 11'-0"
B.S.B. 14" x 8" x 57 lbs
Min Span 15'-0"
B.S.B. 14" x 6" x 46 lbs
Min Span 12'-0"

ANGLE CLEATS 6" x 3-1/2" x 3/8" x 10-1/2" LONG. REF. NO. L5

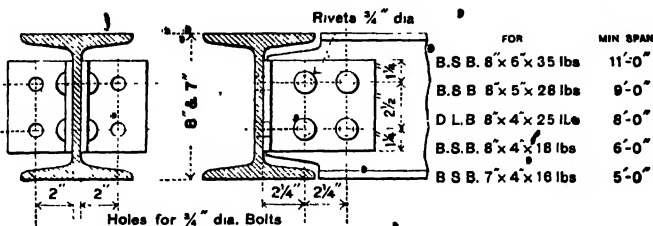
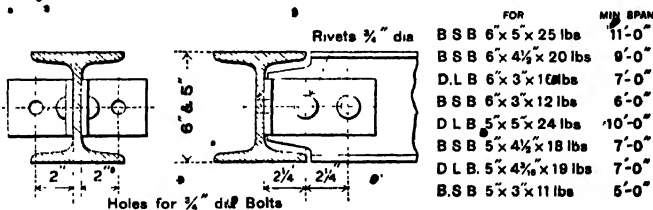
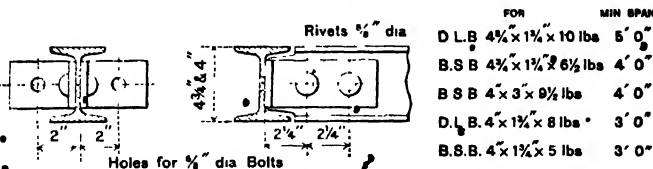
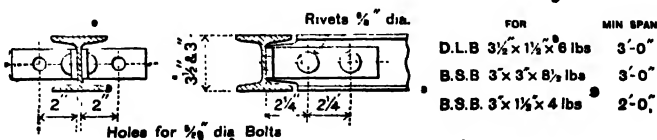
DORMAN, LONG & CO. LIMITED.

STANDARD CONNECTIONS FOR BEAMS

ANGLE CLEATS $6 \times 3\frac{1}{2} \times \frac{3}{8} \times 8\frac{1}{2}$ LONG. REF. NO. L⁶ANGLE CLEATS $6 \times 3\frac{1}{2} \times \frac{3}{8} \times 7$ LONG. REF. NO. L⁷ANGLE CLEATS $6 \times 6 \times \frac{1}{2} \times 5\frac{1}{2}$ LONG. REF. NO. L⁸ANGLE CLEATS $6 \times 3\frac{1}{2} \times \frac{3}{8} \times 7$ LONG. REF. NO. L⁹

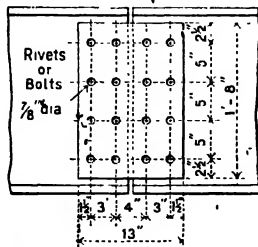
DORMAN, LONG & CO. LIMITED.

STANDARD CONNECTIONS FOR BEAMS

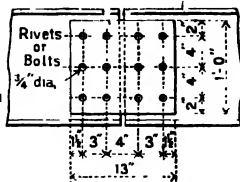
ANGLE CLEATS $6 \times 3\frac{1}{2} \times \frac{3}{8} \times 5$ " LONG. REF. No. L¹⁰ANGLE CLEATS $6 \times 3\frac{1}{2} \times \frac{3}{8} \times 3$ " LONG. REF. No. L¹¹ANGLE CLEATS $6 \times 3\frac{1}{2} \times \frac{3}{8} \times 2\frac{1}{2}$ " LONG. REF. No. L¹²ANGLE CLEATS $6 \times 3\frac{1}{2} \times \frac{3}{8} \times 1\frac{3}{4}$ " LONG. REF. No. L¹³

PORMAN, LONG & CO. LIMITED.

STANDARD CONNECTIONS FOR BEAMS

**FISHPLATE REF. NO. FP1**

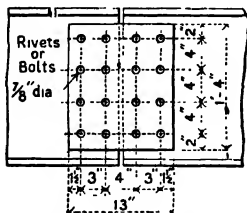
For BSB 24" x 7 1/2" x 100 lbs

**FISHPLATE REF. NO. FP4**

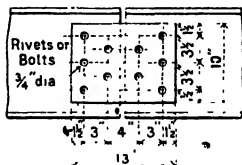
For BSB 16" x 8" x 62 lbs

For BSB 15" x 8" x 59 lbs

For BSB 15" x 5" x 42 lbs

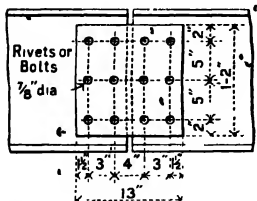
**FISHPLATE REF. NO. FP2**

For BSB 20" x 7 1/2" x 89 lbs

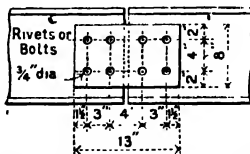
**FISHPLATE REF. NO. FP5**

For BSB 14" x 6" x 57 lbs

For BSB 14" x 6" x 46 lbs

**FISHPLATE REF. NO. FP3**

For BSB 18" x 7" x 75 lbs

**FISHPLATE REF. NO. FP6**

For B.S.B. 12" x 6" x 54 lbs

For B.S.B. 12" x 6" x 44 lbs

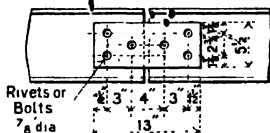
For D.L.B 12" x 5" x 39 lbs

For B.S.B 12" x 5" x 32 lbs

The above Fishplates are for beams supported at joints, and those usually kept in stock are 1/4" thick for the larger, and 3/8" thick for the smaller sizes.

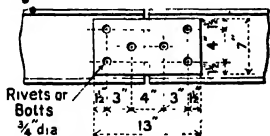
DORMAN, LONG & CO. LIMITED,

STANDARD CONNECTIONS FOR BEAMS

**FISHPLATE REF. NO. FP7**

For BSB 10" x 8" x 70 lbs

For BSB 9" x 7" x 58 lbs

**FISHPLATE REF. NO. FP8**

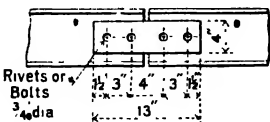
For BSB 10" x 6" x 42 lbs

For DLB 10" x 5" x 31 lbs

For BSB 10" x 5" x 30 lbs

For DLB 9 1/2" x 3 1/2" x 21 1/2 lbs

For BSB 9" x 4" x 21 lbs

**FISHPLATE REF. NO. FP9**

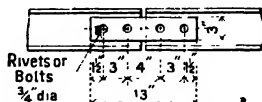
For BSB 8" x 6" x 35 lbs

For BSB 8" x 5" x 28 lbs

For DLB 8" x 4" x 25 lbs

For BSB 8" x 4" x 18 lbs

For BSB 7" x 4" x 16 lbs

**FISHPLATE REF. NO. FP10**

For BSB 6" x 5" x 25 lbs

For BSB 6" x 4 1/2" x 20 lbs

For DLB 6" x 3" x 16 lbs

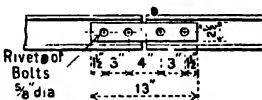
For BSB 6" x 3" x 12 lbs

For DLB 5" x 5" x 24 lbs

For BSB 5" x 4 1/2" x 18 lbs

For DLB 5" x 4 1/2" x 19 lbs

For BSB 5" x 3" x 11 lbs

**FISHPLATE REF. NO. FP11**

For DLB 4 1/2" x 1 1/2" x 10 lbs

For BSB 4 1/2" x 1 1/2" x 6 1/2 lbs

For BSB 4" x 3" x 9 1/2 lbs

For DLB 4" x 1 1/2" x 8 1/2 lbs

For BSB 4" x 1 1/2" x 5 lbs

**FISHPLATE REF. NO. FP12**

For BSB 3" x 3" x 8 1/2 lbs

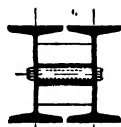
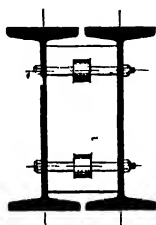
For DLB 3 1/2" x 1 1/2" x 6 lbs

For BSB 3" x 1 1/2" x 4 lbs

The above Fishplates are for beams supported at joints, and those usually kept in stock are 1/2" thick for the larger, and 3/8" thick for the smaller sizes.

DORMAN, LONG & CO. LIMITED.

I BEAMS WITH CAST IRON SEPARATORS.

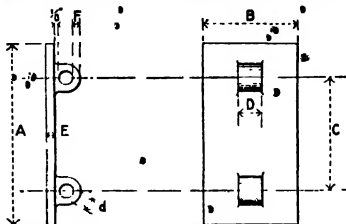


Reference Mark of Beam	Size	Reference Mark of Separator	Centres of Beams	Diameter	Bolts Length	Weight
			In.	In.	In.	Lbs.
BSB 30	24 7 $\frac{1}{2}$ × 100	S ¹	8	7	9 $\frac{3}{4}$	4'97
" 29	20 7 $\frac{1}{2}$ × 89	S ²	8	7	9 $\frac{3}{4}$	4'97
" 28	18 7 × 75	S	7 $\frac{1}{2}$	7	9 $\frac{1}{4}$	4'78
" 27	16 6 × 62	S ¹	6 $\frac{1}{2}$	7	8	3'03
" 26	15 6 × 59	S ¹	6 $\frac{1}{2}$	7	8	3'03
" 25	15 5 × 42	S ¹	6 $\frac{7}{8}$	7	8	3'03
" 24	14 6 × 57	S ²	6 $\frac{1}{2}$	7	8	3'03
" 23	14 6 × 46	S ²	6 $\frac{3}{4}$	7	8	3'03
" 22	12 6 × 54	S ²	6 $\frac{1}{2}$	7	8	3'03
" 21	12 6 × 44	S ²	6 $\frac{7}{8}$	7	8	3'03
DLB 20A	12 5 × 39	S ²	6 $\frac{7}{8}$	7	7 $\frac{1}{2}$	3'02
BSB 20	12 5 × 32	S ²	6 $\frac{3}{4}$	7	7 $\frac{1}{2}$	3'02
" 19	10 8 × 70	S ²	8 $\frac{1}{2}$	7	10 $\frac{1}{4}$	1'78
" 18	10 6 × 42	S ²	6 $\frac{7}{8}$	7	8	1'51
DLB 17A	10 5 × 35	S ²	6 $\frac{1}{2}$	7	7 $\frac{1}{2}$	1'51
BSB 17	10 5 × 30	S ²	6 $\frac{7}{8}$	7	7 $\frac{1}{2}$	1'51
" 16	9 7 × 58	S ¹⁰	7 $\frac{1}{2}$	7	9	1'65
DLB 15A	9 1 3 $\frac{1}{4}$ × 21'5	S ¹¹	4 $\frac{1}{2}$	7	5 $\frac{1}{4}$	1'23
BSB 15	9 4 × 21	S ¹¹	4 $\frac{1}{2}$	7	5 $\frac{1}{4}$	1'23
" 14	8 6 × 35	S ¹²	6 $\frac{1}{8}$	7	8	1'51
" 13	8 5 × 28	S ¹²	6 $\frac{3}{4}$	7	7 $\frac{1}{2}$	1'51
DLB 12A	8 4 × 25	S ¹²	6 $\frac{3}{4}$	7	7 $\frac{1}{2}$	1'51
BSB 12	8 4 × 18	S ¹²	6 $\frac{1}{2}$	7	7 $\frac{1}{2}$	1'45
" 11	7 4 × 16	S ¹³	4 $\frac{1}{2}$	7	5 $\frac{1}{4}$	1'23
" 10	6 5 × 25	S ¹⁴	5 $\frac{7}{8}$	7	7	1'37
" 9	6 4 $\frac{1}{2}$ × 20	S ¹⁴	5 $\frac{7}{8}$	7	6 $\frac{3}{4}$	1'36
DLB 8A	6 3 × 16	S ¹⁴	5 $\frac{7}{8}$	7	6 $\frac{1}{4}$	1'36
BSB 8	6 3 × 12	S ¹⁴	5 $\frac{1}{4}$	7	6 $\frac{1}{2}$	1'32
DLB 7A	5 5 × 24	S ¹⁴	5 $\frac{3}{4}$	7	6 $\frac{1}{2}$	1'32
BSB 7	5 4 $\frac{1}{2}$ × 18	S ¹⁴	5 $\frac{1}{8}$	7	6 $\frac{1}{2}$	1'32
DLB 6A	5 4 $\frac{1}{8}$ × 19	S ¹⁴	5 $\frac{3}{4}$	7	6 $\frac{1}{2}$	1'32

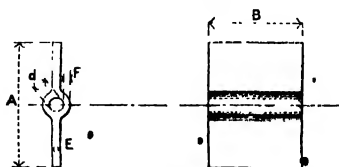
NOTE.—For I Beams of smaller section than 5" × 4 $\frac{1}{8}$ ", single $\frac{5}{8}$ " diameter Bolts are used, with Distance Pieces of 1" gas tubing in lengths cut as required.

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STANDARD CAST IRON SEPARATORS.

FOR USE IN BEAMS FROM 24" $7\frac{1}{2}$ " TO 12" $5\frac{1}{2}$ ".

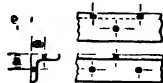
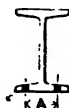
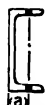
Reference No.	DIMENSIONS IN INCHES						Weight in lbs.
	A	B	C	D	E	F	
S ¹	19 $\frac{1}{2}$	7 $\frac{1}{2}$	13	2	$\frac{3}{4}$	$\frac{3}{4}$	27.10
S ²	16	7 $\frac{1}{2}$	10	2	$\frac{3}{4}$	$\frac{3}{4}$	22.75
S ³	14	6 $\frac{1}{2}$	9	2	$\frac{5}{8}$	$\frac{3}{8}$	19.23
S ⁴	12 $\frac{1}{2}$	5 $\frac{1}{2}$	8	1 $\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	11.78
S ⁵	11 $\frac{1}{2}$	6	7 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	10.83
S ⁶	10 $\frac{1}{2}$	6	7	1 $\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	10.01
S ⁷	8 $\frac{1}{2}$	6	5	1 $\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	8.39

FOR USE IN BEAMS FROM 10" \times 8" TO 5" \times 4 $\frac{1}{2}$ ".

Reference No.	DIMENSIONS IN INCHES					Weight in lbs.
	A	B	C	D	E	
S ⁸	6	7 $\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	7.91
S ⁹	7	6 $\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	6.9
S ¹⁰	5 $\frac{1}{4}$	6 $\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	6.26
S ¹¹	6 $\frac{3}{4}$	4 $\frac{3}{4}$	$\frac{7}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	4.3
S ¹²	5 $\frac{1}{4}$	6	$\frac{7}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	5.1
S ¹³	5	4 $\frac{1}{4}$	$\frac{7}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	4.09
S ¹⁴	3	5	$\frac{7}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	2.92

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STANDARD SPACING OF HOLES IN FLANGES OF CHANNELS, I BEAMS AND ANGLES.



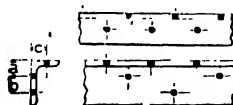
Size of Flange in inches	Dimensions in inches a
4	2 $\frac{1}{4}$
3 $\frac{1}{2}$	2
3	1 $\frac{3}{4}$
2 $\frac{7}{8}$	1 $\frac{1}{2}$
2 $\frac{1}{8}$	1 $\frac{1}{8}$



Size of Angle in inches	Dimensions in inches a b
8x8	3 3
6x6	2 $\frac{1}{4}$ 2 $\frac{1}{4}$
5x5	2 1 $\frac{3}{4}$

Size of Flange in inches	Centres in inches A
7 $\frac{1}{2}$	4 $\frac{1}{2}$
7	4
6	3 $\frac{1}{2}$
5	2 $\frac{3}{4}$
4 $\frac{1}{2}$	2 $\frac{1}{2}$
4 $\frac{1}{8}$	2 $\frac{1}{4}$
4	2 $\frac{1}{4}$
3	1 $\frac{1}{2}$

Size of Angle in inches	Dimensions in inches a
4 $\frac{1}{2}$ x 4 $\frac{1}{2}$	2 $\frac{1}{2}$
4 x 4	2 $\frac{1}{4}$
3 $\frac{1}{2}$ x 3 $\frac{1}{2}$	2
3 x 3	1 $\frac{3}{4}$
2 $\frac{1}{2}$ x 2 $\frac{1}{2}$	1 $\frac{3}{8}$
2 $\frac{1}{4}$ x 2 $\frac{1}{4}$	1 $\frac{1}{4}$
2 x 2	1 $\frac{1}{8}$
1 $\frac{7}{8}$ x 1 $\frac{7}{8}$	1
1 $\frac{1}{2}$ x 1 $\frac{1}{2}$	$\frac{7}{8}$
1 $\frac{1}{4}$ x 1 $\frac{1}{4}$	$\frac{3}{4}$



Size of Angle in inches	Dimensions in inches a b c
7 x 3 $\frac{1}{2}$	2 $\frac{1}{2}$ 3 2
6 $\frac{1}{2}$ x 3 $\frac{1}{2}$	2 $\frac{1}{2}$ 2 $\frac{1}{2}$ 2 $\frac{1}{2}$
6 $\frac{1}{2}$ x 3 $\frac{1}{2}$	2 $\frac{1}{2}$ 2 $\frac{1}{2}$ 2
6 x 3	2 $\frac{1}{4}$ 2 $\frac{1}{4}$ 2 $\frac{1}{4}$
6 x 3 $\frac{1}{2}$	2 $\frac{1}{4}$ 2 $\frac{1}{4}$ 2
6 x 3	2 $\frac{1}{4}$ 2 $\frac{1}{4}$ 1 $\frac{3}{4}$
5 $\frac{1}{2}$ x 3	2 $\frac{1}{4}$ 2 2
5 $\frac{1}{2}$ x 3	2 $\frac{1}{4}$ 2 1 $\frac{3}{4}$
5 x 4	2 1 $\frac{3}{4}$ 2 $\frac{1}{4}$
5 x 3 $\frac{1}{2}$	2 1 $\frac{3}{8}$ 2
5 x 3	2 1 $\frac{3}{8}$ 1 $\frac{3}{8}$

Size of Angle in inches	Dimensions in inches a b
4 $\frac{1}{2}$ x 3 $\frac{1}{2}$	2 $\frac{1}{2}$ 2
4 x 3 $\frac{1}{2}$	2 $\frac{1}{4}$ 2
4 x 3	2 $\frac{1}{4}$ 1 $\frac{7}{8}$
3 $\frac{1}{2}$ x 3	2 1 $\frac{7}{8}$
3 $\frac{1}{2}$ x 2 $\frac{1}{2}$	2 1 $\frac{3}{8}$
3 x 2 $\frac{1}{2}$	1 $\frac{3}{4}$ 1 $\frac{3}{8}$
3 x 2	1 $\frac{3}{8}$ 1 $\frac{1}{8}$
2 $\frac{1}{2}$ x 2	1 $\frac{3}{8}$ 1 $\frac{1}{8}$
2 x 1 $\frac{1}{2}$	1 $\frac{1}{8}$ $\frac{7}{8}$

NOTES ON PLATE GIRDERS.

General Note.—On the preceding pages, tables of I beams and compounds are given, shewing the loads carried by each for various spans; but under some conditions, as for instance where the deflection allowed is very small, it will sometimes be found that the plate girders, given in the following pages, may be used with advantage.

Tabular Loads.—The loads given in the tables include the weights of the girders themselves, and are, in each case, calculated from the modulus of the net section, i.e., both flanges holed. They are based on an extreme fibre stress of $7\frac{1}{2}$ tons per square inch, being one-fourth of the average breaking stress.

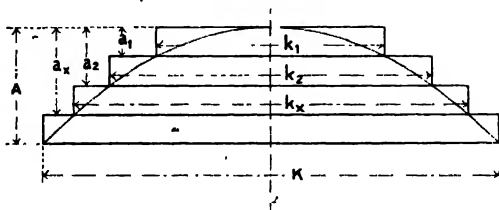
When it is considered advisable to adopt any other extreme fibre stress, say f tons per square inch, the tabular loads should be altered in the ratio $\frac{f}{7.5}$.

The loads are also based on the assumption that the girders receive efficient lateral support, and the webs are adequately stiffened.

Stiffeners.—The stiffening of plate girders may be effected by means of vertical angles fitting between the inner surfaces of the flange angles, and properly riveted to the web. In the case of girders having double webs, diaphragms may be adopted, which ensure greater unity than that obtained by using outer stiffeners alone. The spacing of the stiffeners depends on the depth of the girder, the thicknesses of web plates, and the purposes for which the girders are required.

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Curtailment of Plates.—Where it is not desirable to allow the flange plates to extend the full length of the girder, the limit to which they can be curtailed, for girders supported at both ends and having an uniformly distributed load, may be found as follows:—



Let A = total area of flange, in square inches.

a_1 = area of top plate, in square inches.

a_2 = area of two top plates, in square inches.

a_x = area of number x top plates, in square inches.

K = span of girder, in feet.

k_1 = length of top plate, in feet.

k_2 = length of second plate, in feet.

k_x = length of x th plate, in feet.

Then:—

$$k_1 = \frac{K\sqrt{a_1}}{\sqrt{A}}, \quad k_2 = \frac{K\sqrt{a_2}}{\sqrt{A}}, \quad k_x = \frac{K\sqrt{a_x}}{\sqrt{A}}$$

It is customary to make the plates longer than the lengths found by the above formulæ to the extent of about three pitches of rivets at each end, and the plate next to the flange angles is usually the full length of the girder.

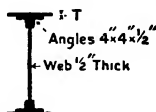
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PLATE GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.



Spans in feet	Depth over Angles 30 inches			Depth over Angles 36 inches			Depth over Angles 30 inches		Depth over Angles 36 inches		Depth over Angles 42 inches	
	Thickness of Angles in inches			Thickness of Angles in inches			Thickness of Angles in inches		Thickness of Angles in inches		Thickness of Angles in inches	
	3/8	1/2	5/8	3/8	1/2	5/8	1/2	5/8	1/2	5/8	1/2	5/8
20	49	50	71	61	76	89	75	..	86	..	105	..
22	44	55	64	56	69	81	68	..	79	93	96	..
24	40	50	59	51	63	74	62	74	79	93	96	..
26	37	46	54	47	53	68	57	68	73	86	88	104
28	35	43	51	44	54	63	53	63	67	80	82	97
30	32	40	47	41	51	59	50	59	63	74	77	90
32	30	38	44	38	47	55	47	55	59	70	72	85
34	..	..	..	36	45	52	..	..	55	66	68	80
36	..	..	..	34	42	49	..	..	52	62	64	75
38	..	..	..	..	..	..	..	..	50	59	61	71
40	..	..	..	..	..	..	..	..	..	..	57	68
42	..	..	..	..	..	..	..	..	..	..	55	65



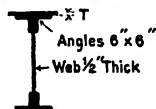
Spans in feet	Depth over Angles 30 inches Width of Flange 12 inches					Depth over Angles 36 inches Width of Flange 12 inches						
	Total thickness, T, in inches, of flats in one flange					Total thickness, T, in inches, of flats in one flange						
	1/2	5/8	3/4	7/8	1	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
24	77	84	92	100	..	96	105	115	..	..	..	..
26	71	78	85	92	99	83	97	106	114	..	..	..
28	66	72	79	86	92	82	90	98	106	114	..	..
30	61	67	74	80	86	77	84	92	99	107	114	..
32	57	63	69	75	81	72	79	86	93	100	107	114
34	54	60	65	71	76	68	74	81	87	94	101	107
36	..	..	..	..	..	64	70	76	83	89	95	101
38	61	66	72	78	84	90	96
40	57	63	69	74	80	86	91

NOTE.—When T exceeds 3/4", two flats should be used.

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PLATE GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.



Spans in feet	Depth over Angles 36 inches Angles 6" x 6" x 1/2" Width of Flange 14"					Depth over Angles 42 inches Angles 6" x 6" x 1/2" Width of Flange 14"				
	Total thickness, T, in inches, of flats in one flange					Total thickness, T, in inches, of flats in one flange				
	1/2	5/8	3/4	7/8	1	1/2	5/8	3/4	7/8	1
24	121					135				
26	111	121	..	..	..	125	136	..	..	..
28	104	113	..	..	..			..	..	..
30	97	106	114	..	..	117	127	138	..	..
32	91	99	107	116	..	109	119	129	139	..
34	85	93	101	109	117	103	112	121	131	140
36	81	88	95	103	110	97	106	115	123	132
38	76	83	90	97	104	92	100	109	117	125
40	72	79	86	92	99	88	95	103	111	119
42	..	..	..	..	..	83	91	98	106	113
44	..	..	..	..	..	80	87	94	101	108
46	..	..	..	..	..	76	83	90	97	103

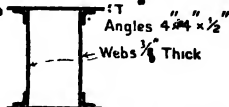
Spans in feet	Depth over Angles 48 inches Angles 6" x 6" x 5/8" Width of Flange 18"						
	Total thickness, T, in inches, of flats in one flange						
	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
30	158	..	..	..	..	..	..
32	148	161	..	..	..	..	..
34	139	151	..	..	..	..	..
36	131	143	154	..	..	..	..
38	125	135	146	157	..	..	..
40	118	129	139	149	159	..	..
42	113	122	132	142	152	..	..
44	108	117	126	135	145	154	..
46	103	112	121	130	138	147	156
48	..	107	116	124	133	141	150
50	95	103	111	119	127	136	144
52	91	99	107	114	122	130	138
54	88	95	103	110	118	126	133

NOTE.—When T exceeds 3/4", two flats should be used.

DORMAN, LONG & CO. LIMITED.

BOX PLATE GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.



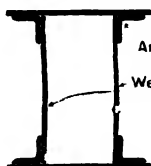
Spans in feet	Depth over Angles 30 inches Width of Flange 18 inches								Depth over Angles 30 inches Width of Flange 18 inches							
	Total thickness, T, in inches, of flats in one flange								Total thickness, T, in inches, of flats in one flange							
	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4		1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	
24	94	105	116	127	133	149			118	131	145	157	170			
26	87	97	107	117	127	137	147		109	121	133	145	157	169	182	
28	81	90	99	109	118	127	137		101	112	124	135	146	157	169	
30	75	84	93	101	110	119	128		95	106	115	126	136	147	157	
32	71	79	87	95	103	111	120		89	98	108	118	128	138	148	
34	67	74	82	90	97	105	113		83	93	102	111	120	130	139	
36	..	..	..	..	..	..	..		79	87	96	105	114	122	131	
38	..	..	..	..	..	..	..		75	83	91	99	108	116	124	
40	..	..	..	..	..	..	..		71	79	87	94	102	110	118	
Spans in feet	Depth over Angles 42 inches Width of Flange 18 inches								Depth over Angles 48 inches Width of Flange 18 inches							
	Total thickness, T, in inches, of flats in one flange								Total thickness, T, in inches, of flats in one flange							
	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4		1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	
24	152	170	187	205					180	200	220	240				
26	140	157	173	189	205				166	185	203	221	240			
28	130	145	160	175	190	205			154	171	189	206	223	240		
30	122	136	150	164	178	193	206		144	160	176	192	208	224	240	
32	114	127	140	153	167	180	193		135	150	165	180	195	210	225	
34	107	120	132	144	157	169	181		127	141	155	169	184	198	212	
36	101	113	125	136	148	160	171		120	133	147	160	173	187	200	
38	96	107	118	129	140	151	162		114	126	139	152	164	177	190	
40	91	102	112	123	133	144	154		108	120	132	144	156	168	180	
42	87	97	107	117	127	137	147		103	114	126	137	148	160	171	
44	83	93	102	112	121	131	140		98	109	120	131	142	153	164	
46	79	89	98	107	116	125	134		94	104	115	125	136	146	157	
48	76	85	94	102	111	120	129		90	100	110	120	130	140	150	
50	..	..	..	..	..	..	..		86	96	106	115	125	134	144	
52	..	..	..	..	..	..	..		83	92	102	111	120	129	138	
54	..	..	..	..	..	..	..		80	89	98	107	116	124	133	

NOTE.—When T exceeds 3/4", two flats should be used.

DORMAN, LONG & CO. LIMITED.

BOX PLATE GIRDERS.

SAFE LOADS IN TONS UNIFORMLY DISTRIBUTED.



Spans in feet	Depth over Angles 42 inches Width of Flange 24 inches							Depth over Angles 48 inches Width of Flange 24 inches						
	Total thickness, T, in inches, of flats in one flange							Total thickness, T, in inches, of flats in one flange						
	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
24	218	241	.	.	.	.	.	257	..	..	..	.	.	.
26	201	222	244	.	.	.	.	237	262	..	..	.	.	..
28	186	207	227	..	..	.	..	220	243	266	..	..	.	.
30	174	193	212	230	..	..	..	205	227	248	270	.	.	..
32	163	181	198	216	234	..	..	193	213	233	253	273	.	..
34	154	170	187	203	220	237	..	181	200	219	238	257	276	.
36	145	161	176	192	208	224	239	171	189	207	225	243	261	279
38	137	152	167	182	197	212	227	162	179	196	213	230	247	264
40	131	145	159	173	187	201	215	154	170	186	203	219	235	251
42	124	138	151	165	178	192	205	147	162	177	193	208	224	239
44	119	131	144	157	170	183	196	140	155	169	184	199	214	228
46	113	126	138	150	163	175	187	134	148	162	176	190	204	218
48	109	121	132	144	156	168	179	128	142	155	169	182	196	209
50	..	..	..	..	..	..	..	123	136	149	162	175	188	201
52	..	..	..	..	..	..	..	118	131	143	156	168	181	193
54	..	..	..	..	..	..	..	114	126	138	150	162	174	186

NOTE.—When T exceeds 3/4", two flats should be used.

DORMAN, LONG & CO. LIMITED.

NOTES ON ROOFS.

APPROXIMATE WEIGHTS, PER SQUARE FOOT OF GROUND AREA COVERED, FOR STEEL ROOF PRINCIPALS, WITH THE VARIOUS FORMS OF COVERING ENUMERATED BELOW:—

Roof covered with corrugated sheets and steel purlins	-	-	7 to 9 lbs.
" " " slates and steel purlins	-	-	12 " 16 "
" " " slates, 1½" boards and steel purlins	-	-	15 " 20 "

For large spans special calculations should be made.

PRESSURE OF WIND ON ROOFS (PER UNWIN'S FORMULÆ).

a = Angle of surface of roof, with direction of wind.

F = Force of wind in pounds per square foot.

N = Pressure normal to surface of roof = $F \cdot \sin a^{1.84} \cos a - 1$.

V = " perpendicular to direction of wind = $F \cdot \cot a \cdot \sin a^{1.84} \cos a$.

H = " parallel " " " " = $F \cdot \sin a^{1.84} \cos a$.

PRESSURE OF WIND ON ROOFS WHERE THE PROPORTION OF HEIGHT TO HALF SPAN = 1:2.*

F. in lbs per sq. ft.	5	10	15	20	25	30	35	40	45	50	55	60
N	2.955	9.885	11.814	7.751	7.206	5.233	3.265	2.529	5.324	5.354	5.354	5.354
V	2.655	3.795	10.613	25.159	18.552	21.223	85.265	29.153	1.818			
H	1.352	7.405	5.467	8.758	1.945	10.812	15.135	14.851	16.2			

PRESSURES OF WIND ON ROOFS.

Angle of Roof a	5	10	20	30	40	50	60	70	80	90
N = F ×	.125	.24	.45	.59	.66	.83	.95	1.00	1.02	1.00
V = F ×	.122	.24	.42	.53	.57	.64	.61	.50	.35	.17
H = F ×	.01	.04	.15	.27	.33	.53	.73	.85	.96	.99

PROPORTIONS OF ROOFS.

Proportion of height to half span	Angle		Proportion of length of Rafter		Proportion of height to half span	Angle		Proportion of length of Rafter	
	Deg.	Min.	to height	to half span		Deg.	Min.	to height	to half span
1/1	45	0	1.41421	1.41421	*1/2	26	34	2.23607	1.11803
1/1.5	33	41	1.80277	1.20185	1/2.5	21	48	2.69258	1.07703
1/√3	30	0	2.00000	1.15470	1/3	18	26	3.16228	1.05409

*The proportion, 1:2, of height to half span, has been adopted as meeting general requirements.

NORMAN, LONG & CO. LIMITED.

ROOF TRUSSES.

Table of Co-efficients for the determination of Stresses, and Lengths of Members, in Roof Trusses, for any span, the proportion of height to half the span being 1:2.

To find the Stress in any Member:—

Let S = Span between the points of intersection of the Rafter and Tie.

L = Total Dead Load carried by the Truss, including its own weight.

W = Total Wind Pressure resisted by the Truss, acting on one side of roof, and normal to its surface.

f = Total Stress required.

Then $f = (L \text{ multiplied by Co-efficient for Dead Load}) + (W \text{ multiplied by Co-efficient for Wind Pressure}).$

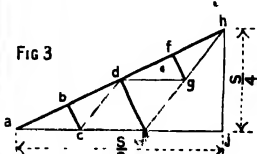
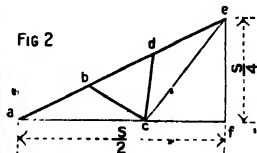
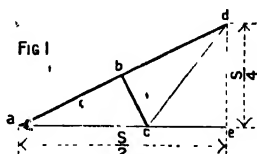
In Trusses of larger spans it is sometimes advisable to provide for expansion, in which case the co-efficient for wind pressure corresponding to "one end free" should be used.

To find the length of any Member between points of intersection:—

Multiply S by the length co-efficient for that member.

NOTE. The following Stress Co-efficients have been calculated on the assumption that the roof purlins occur over the points of intersection of the various members with the rafter; when such is not the case, bending is produced in the rafter which necessitates further calculation, or allowance being made when deciding its section.

Member of Truss	STRESS CO-EFFICIENTS			Length Co-efficients
	Dead Load	Normal Wind Pressure Both ends fixed	One end free	
FIG. 1.	ab	.838	.875	.27950
	bd	.727	.875	.27950
	bc	.223	.500	.13975
	ac	.750	.978	.31250
	cd	.500	.419	.18750
FIG. 2.	cd	.250	.559	.31250
	ab	.932	1.042	.18634
	bd	.758	.820	.18634
	de	.783	1.042	.18634
	bc	.179	.401	.16797
	de	.179	.401	.16797
	ac	.833	1.165	.31250
	cf	.500	.419	.18750
FIG. 3.	ce	.333	.745	.31250
	ab	.978	1.125	.13975
	bd	.922	1.125	.13975
	df	.866	1.125	.13975
	fh	.811	1.125	.13975
	bc	.112	.250	.06987
	fg	.112	.250	.06987
	de	.224	.500	.13975
	ac	.875	1.258	.15625
	ce	.750	.978	.15625
	ej	.500	.419	.18750
	cd	.125	.279	.15625
	dh	.125	.279	.15625
	gh	.375	.838	.15625
	eg	.250	.559	.15625



NOTE.—Heavy lines indicate Compression and light lines Tension Members.

DORMAN, LONG & CO. LIMITED.

ROOF TRUSSES.

Table of Co-efficients for the determination of Stresses, &c.

		STRESS CO-EFFICIENTS			
Member of Truss	Dead Load	Normal Wind Pressure		Length Co-efficients	
		Both ends fixed	One end free		
FIG. 4.	ab	1.048	1.250	1.250	0.6987
	bd	1.020	1.250	1.250	0.6987
	dt	.992	1.250	1.250	0.6987
	fh	.964	1.250	1.250	0.6987
	hk	.936	1.250	1.250	0.6987
	km	.908	1.250	1.250	0.6987
	mo	.880	1.250	1.250	0.6987
	oq	.852	1.250	1.250	0.6987
	bc	.056	.125	.125	.03494
	fe	.056	.125	.125	.03494
	kl	.056	.125	.125	.03494
	op	.056	.125	.125	.03494
	de	.112	.250	.250	.06987
	mn	.112	.250	.250	0.6987
	hj	.224	.500	.500	.13975
	ac	.937	1.397	1.537	.07812
	ce	.975	1.258	1.397	.07812
	ei	.750	.578	1.118	.15625
	jr	.500	.419	.559	.13750
	FIG. 5.	cd	.062	.140	.140	.07812
dg		.062	.140	.140	.07812
lm		.062	.140	.140	.07812
mp		.062	.140	.140	.07812
gr		.187	.419	.419	.07812
hl		.187	.419	.419	.07812
eg		.125	.279	.279	.07812
ln		.125	.279	.279	.07812
nq		.437	.978	.978	.07812
ap		.375	.838	.838	.07812
jn		.250	.559	.559	.06987
ab		1.025	1.207	1.208	.09317
bd		.938	1.097	1.097	.09317
de		.950	1.208	1.208	.09317
eg		.913	1.208	1.208	.09317
gj		.826	1.097	1.097	.09317
jk		.838	1.208	1.208	.09317
bc		.090	.200	.200	.08398
cd		.090	.200	.200	.08398
gh		.090	.200	.200	.08398
jh	.090	.200	.200	.08398	
ef	.224	.500	.500	.13975	
ac	.917	1.351	1.491	.15625	
ce	.750	.978	1.118	.15625	
fl	.509	.419	.559	.13750	
ce	.167	.373	.373	.15625	
eh	.167	.373	.373	.15625	
hk	.417	.932	.932	.15625	
fh	.250	.559	.559	.15625	

FIG. 4.

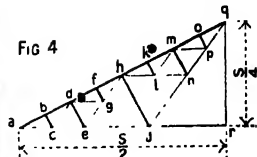
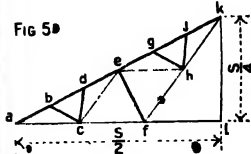
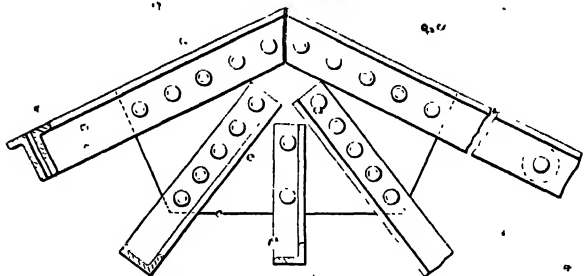


FIG. 5.

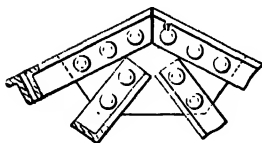


NOTE.—Heavy lines indicate Compression and light lines Tension Members.

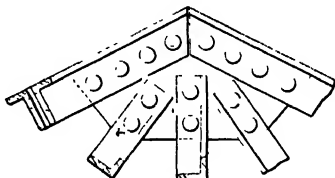
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TYPE CONNECTIONS FOR
ROOF TRUSSES

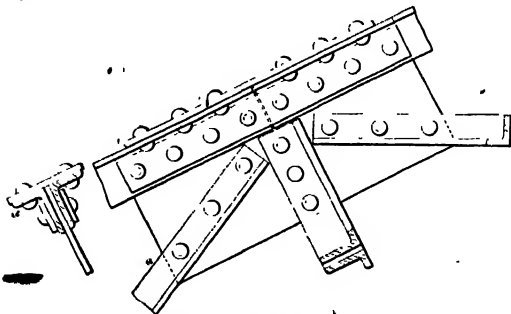
Detail at "q," Fig 4 & "k," Fig 5.



Detail at "d," Fig. 1.



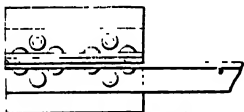
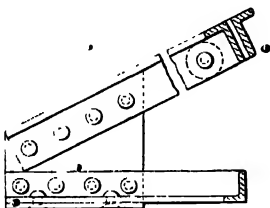
Detail at "h," Fig 3



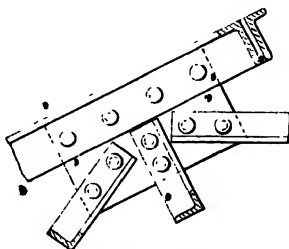
Detail at "h," Fig 4 & "e," Fig 5

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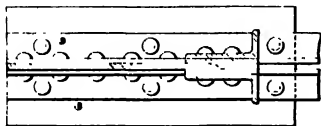
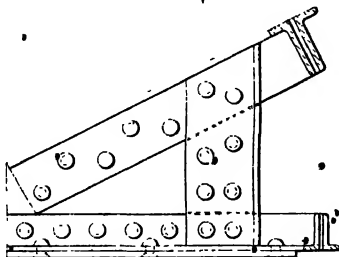
TYPE CONNECTIONS FOR ROOF TRUSSES



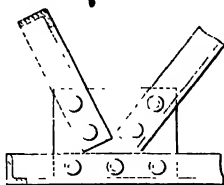
Detail at "a," Figs 1 & 2.



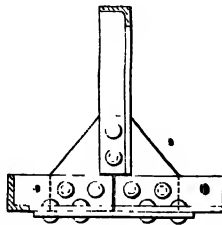
Detail at "d," Figs. 3 & 4.



Detail at "a," Figs. 4 & 5.



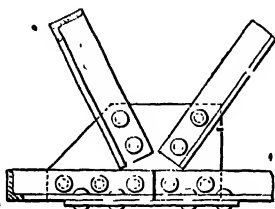
Detail at "c," Figs. 1, 3 & 4.



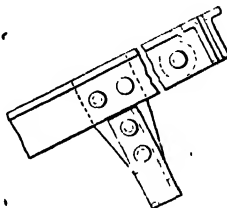
Detail at "a" Fig. 4 & "l," Fig. 5.

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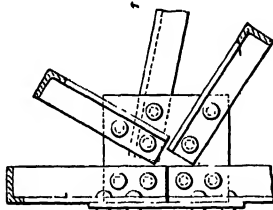
TYPE CONNECTIONS FOR ROOF TRUSSES



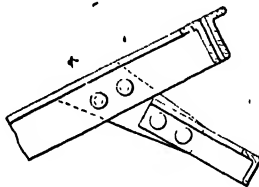
Detail at "a" Figs. 3 & 4.



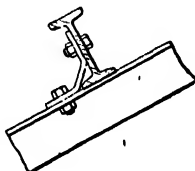
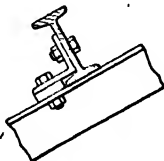
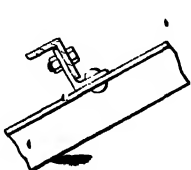
Detail at "b," Figs. 1, 3 & 4.



Detail at "c," Fig. 2.



Detail at "b," Figs. 2 & 3.



Purlin Cleat Connections.

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NOTES ON TROUGHING.

Troughing, as illustrated on the following pages, commands a leading place on the market; and can be recommended for a variety of purposes. When used for road bridges, it not only affords a watertight superstructure for carrying the road metalling, but, in most cases, dispenses with the use of cross girders and frequently with the main girders also. In railway bridges it frequently takes the place of cross girders, railbearers and timber planking; at the same time forming a safer floor in case of derailment. A maximum amount of headway under the bridge is attained, and a saving in cost effected. The smaller sections will be found especially useful for the decking of piers, floors of warehouses, ceilings of subways, strong rooms, etc.

The troughing is usually riveted, before dispatched, in sections of three, thus:—



The site connections are generally made with rivets, but bolted connections may be adopted when found advisable; either method affording easy means of erection.

Single troughs, as illustrated on pages 26 and 27, are frequently used as roof gutters, and permit of the supports being placed at long distances apart.

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Dimensions, Properties, Safe Loads, &c.—Diagrams of the various sections of built-up troughing are shewn on pages 123 to 131; and tables, giving dimensions, properties and safe loads, will be found on pages 132 to 134. The properties have been carefully calculated on their correct profiles, all fillets and rounded corners being taken into consideration.

The tabular loads include the weight of the troughing itself, and are calculated from the section modulus of the width "C" shewn on diagrams.

They are based on an extreme fibre stress of $6\frac{1}{2}$ tons per square inch.

From these particulars the section required to safely carry any specified load may be easily determined.

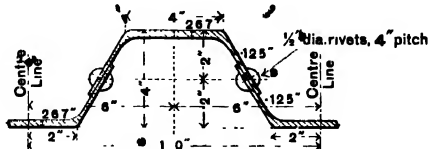
EXAMPLES.—The application of the various sizes of troughing to meet different requirements, together with the necessary calculations, are given on pages 135 to 139.

Handrail Standards.—The types of handrail standards generally adopted in trough bridges are shewn on page 140.

Illustrations of Trough Bridges.—Illustrations shewing the use of troughing as applied to bridge work, will be found on later pages.

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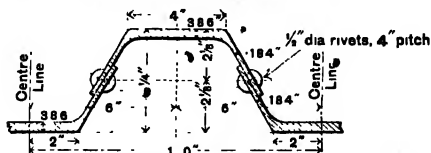
STEEL TROUGHING



O MINIMUM

weight per sq. ft. of covered area = 13.4 lbs

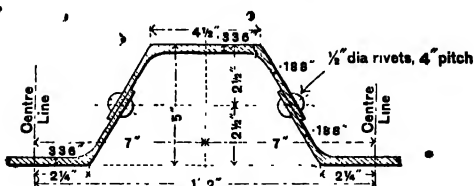
Section Modulus = 4.92



O MAXIMUM

weight per sq. ft. of covered area = 19.06 lbs

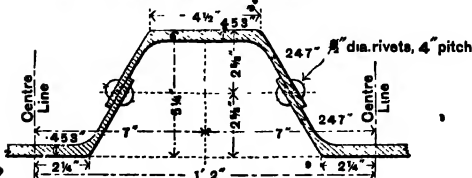
Section Modulus = 6.55



A MINIMUM

weight per sq. ft. of covered area = 17.25 lbs

Section Modulus = 8.4



A MAXIMUM

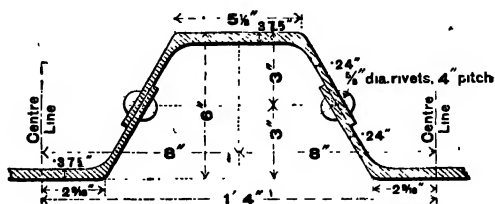
weight per sq. ft. of covered area = 23.1 lbs

Section Modulus = 11.05

FOR PROPERTIES AND SAFE LOADS SEE PAGES 132 & 133.

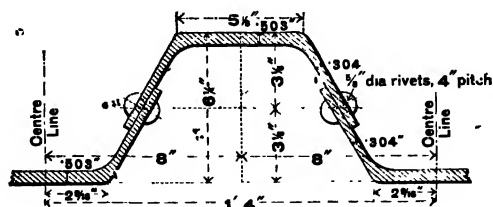
DORMAN, LONG & CO., LIMITED

STEEL TROUGHING

**B MINIMUM**

weight per sq ft of covered area = 21.8 lbs

Section Modulus = 13.5

**B MAXIMUM**

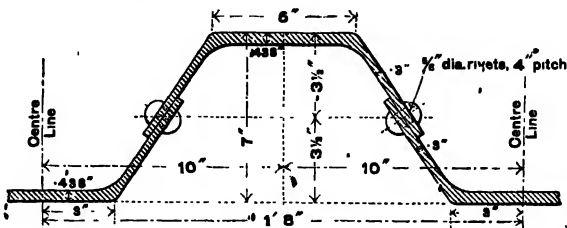
weight per sq. ft. of covered area = 28 lbs

Section Modulus = 17.5

FOR PROPERTIES AND SAFE LOADS SEE PAGES 132 & 133.

DORMAN, LONG & CO. LIMITED

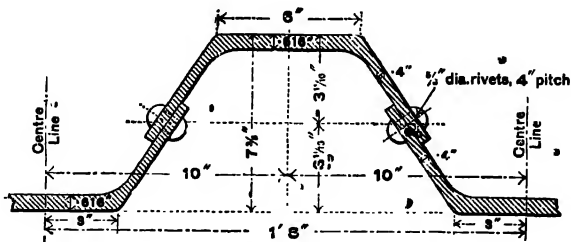
STEEL TROUGHING



C MINIMUM

weight per sq. ft. of covered area = 24.52 lbs

Section Modulus = 21.62



C MAXIMUM

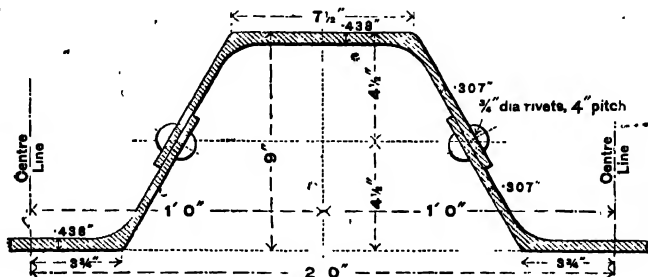
weight per sq. ft. of covered area = 32.97 lbs

Section Modulus = 30.6

FOR PROPERTIES AND SAFE LOADS SEE PAGES 132 & 133.

DORMAN, LONG & CO. LIMITED.

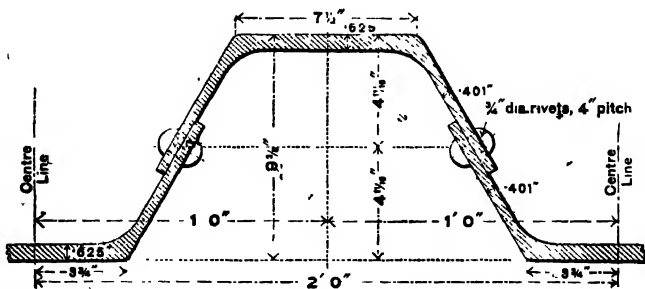
STEEL TROUGHING



C1 MINIMUM

weight per sq ft of covered area = 26.26 lbs

Section Modulus = 36.57



C1 MAXIMUM

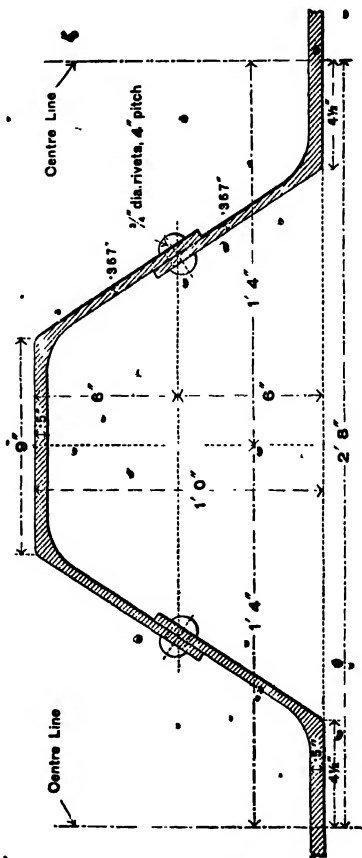
weight per sq. ft. of covered area = 35.02 lbs

Section Modulus = 51.45

FOR PROPERTIES AND SAFE LOADS SEE PAGES 132 & 133.

DORMAN, LONG & CO. LIMITED

STEEL TROUGHING



D MINIMUM

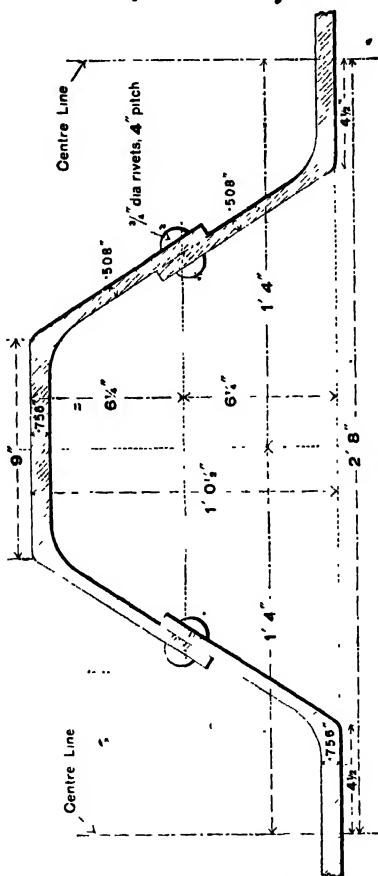
Weight per sq. ft. of covered area = 28.78 lbs
Section Modulus = 72.67

D MINIMUM

FOR PROPERTIES AND SAFE LOADS SEE PAGES 132 & 133.

DORMAN, LONG & CO. LIMITED.

STEEL TROUGHING



D MEDIUM

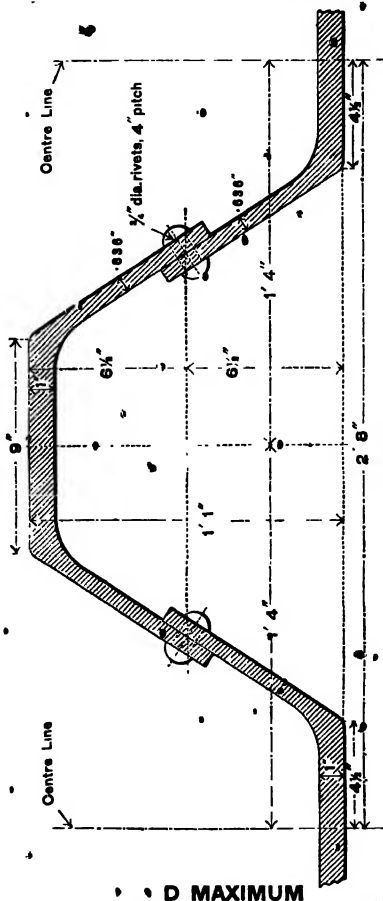
Weight per sq ft of covered area = 40.5 lbs
 Section Modulus = 103.54

D MEDIUM

FOR PROPERTIES AND SAFE LOADS SEE PAGES 132 & 133.

DORMAN, LONG & CO. LIMITED.

STEEL TROUGHING



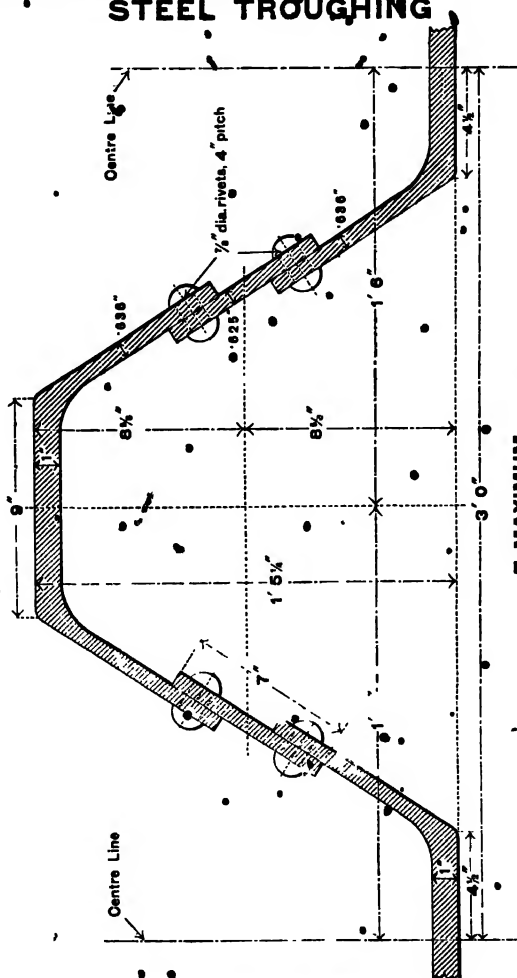
D MAXIMUM

Weight per sq. ft. of covered area = 51.83 lbs
 Section Modulus = 135.8

FOR PROPERTIES AND SAFE LOADS SEE PAGES 132 & 133.

DORMAN, LONG & CO. LIMITED

STEEL TROUGHING



E MAXIMUM

Weight per sq. ft. of covered area = 56.75 lbs

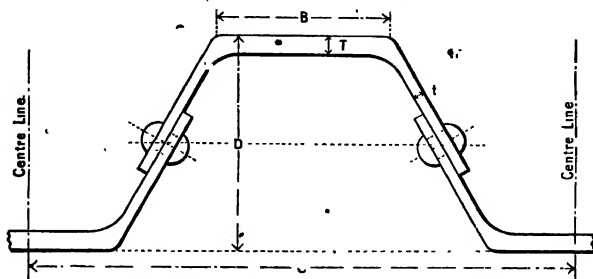
Section Modulus = 203.87

E MAXIMUM

FOR PROPERTIES AND SAFE LOADS SEE PAGE 134.

LORMAN, LONG & CO. LIMITED.

STEEL TROUGHING.

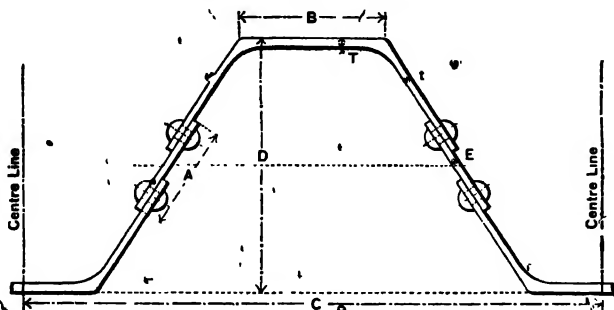


DIMENSIONS AND PROPERTIES.

Reference Mark	Weight per sq. ft. of covered area in lbs.	Centres		Depths		Width of Flange	Thick- ness of Flange	Thick- ness of Web	Rivets		Section Modulus for width "0"
		C	D	B	T				t	Dis.		Pitch
		ft.	in.	ft.	in.	ins.	ins.	in.	ins.	ins.	
D. Max.	51.83	2	8	1	1	9	1.000	.603	¾	4	135.80
D. Mod.	40.50	2	8	1	0½	9	.756	.508	¾	4	103.54
D. Min.	28.78	2	8	1	0	9	.500	.367	¾	4	72.67
C ¹ Max.	35.02	2	0		9¾	7½	.625	.401	¾	4	51.45
C ¹ Min.	26.26	2	0		9	7½	.438	.307	¾	4	36.57
C Max.	32.97	1	8		7¾	6	.616	.400	⅝	4	30.60
C Min.	24.52	1	8		7	6	.438	.300	⅝	4	21.62
B. Max.	28.00	1	4		6¼	5½	.503	.304	⅝	4	17.50
B. Min.	21.80	1	4		6	5¼	.375	.240	⅝	4	13.50
A. Max.	23.10	1	2		5¼	4½	.453	.247	½	4	11.05
A. Min.	17.61	1	2		5	4½	.336	.188	½	4	8.40
O. Max.	19.06	1	0		4¼	4	.386	.184	½	4	6.55
O Min.	13.40	1	0		4	4	.267	.125	½	4	4.92

DORMAN, LONG & CO., LIMITED.

STEEL TROUGHING.



DIMENSIONS AND PROPERTIES.

Reference Mark	Weight per sq. ft. of covered area in lbs.	Centres		Depth	Width of Flange	Thickness of Flange	Thickness of Web	Flats		Rivets		Section Modulus for width "C"
		C	D					Width	Thickness	Dia.	Pitch	
E. Max.	56.76	ft. in. 3 0	ft. in. 1 5 1/4	ins. 9	ins. 1.000	ins. .36	ins. 7	ins. 5/8	ins. 3/8	ins. 4	ins. 4	203.87
E. Min.	32.6	3 0	1 3 1/4	9	.500	.36	7	5/8	3/8	4	4	76.6

SAFE LOADS IN CWTs. PER SQUARE FOOT.

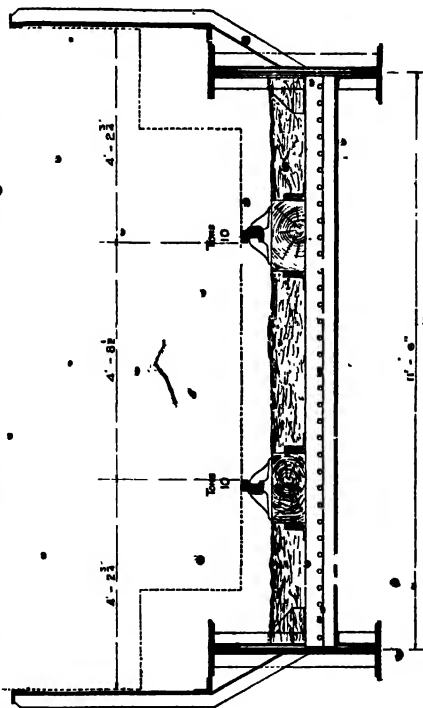
Reference Mark	SPAN IN FEET													
	14	16	18	20	22	24	26	28	30	32	34	36	38	40
E. Max.	30.0	23.0	18.2	14.7	12.2	10.2	8.7	7.6	6.5	5.7	5.1	4.5	4.1	3.7
E. Min.	15.4	11.8	9.3	7.5	6.2	5.2	4.4	3.8	3.3	2.9	2.6	2.3	2.1	1.9

SAFE DISTRIBUTED LOADS IN TONS FOR WIDTH "C."

Reference Mark	SPAN IN FEET													
	14	16	18	20	22	24	26	28	30	32	34	36	38	40
E. Max.	63.1	55.2	49.1	44.2	40.2	36.8	34.0	31.8	29.4	27.6	26.0	24.5	23.2	22.1
E. Min.	32.4	28.3	25.2	22.7	20.6	18.9	17.4	16.2	15.1	14.2	13.3	12.6	11.9	11.3

DORMAN, LONG & CO. LIMITED

APPLICATION OF "C MAX" SECTION TO SINGLE LINE RAILWAY.



STRENGTH OF FLOOR AS SHOWN ABOVE.

Live Load (wheel load 10 Tons) distributed over 3 Widths,
 "C" = 5ft. 0in.

Dead Load per square foot = 145lbs.

Total Dead Load on 3 Widths "C" = $\frac{11 \cdot 5' \times 5' \times 145}{2240} = 3 \cdot 72$ Tons

Bending Moment due to Live Load = $10 \times 3 \cdot 25' \times 12'' = 380$ inch tons

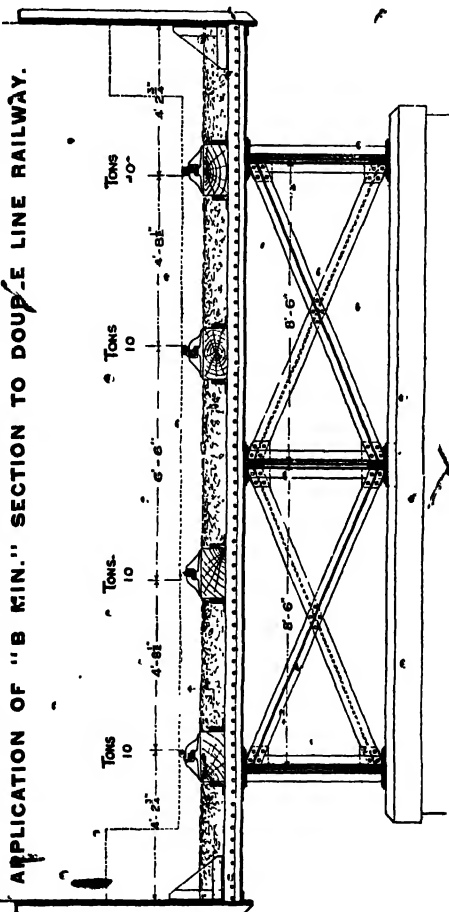
Bending Moment due to Dead Load = $3 \cdot 72 \times 11 \cdot 5' \times 12'' = 64 \cdot 17$ " " "

Total $454 \cdot 17$ " " "

Modulus of 3 widths "C" = $3 \times 30 \cdot 6 = 91 \cdot 8$.

Stress = $\frac{454 \cdot 17}{91 \cdot 8} = 4 \cdot 94$ Tons per square inch.

APPLICATION OF "B MIN." SECTION TO DOUBLE LINE RAILWAY.



STRENGTH OF FLOOR AS SHEWEN ABOVE.

Live Load (wheel load 10 Tons) distributed over 4 Widths,
 "C" = 5ft. 4in.

Dead Load, per square foot = 125lbs.

Total Dead Load on 4 Widths "C" = $\frac{8' \times 5.33' \times 125}{2240} = 2.38$ Tons.

Bending Moment due to Live Load = $\frac{10 \times 3.12 \times 4.88' \times 12''}{8} = 228.38$ inch tons

Bending Moment due to Dead Load = $\frac{2.38 \times 8' \times 12''}{8} = 28.56$ " " "

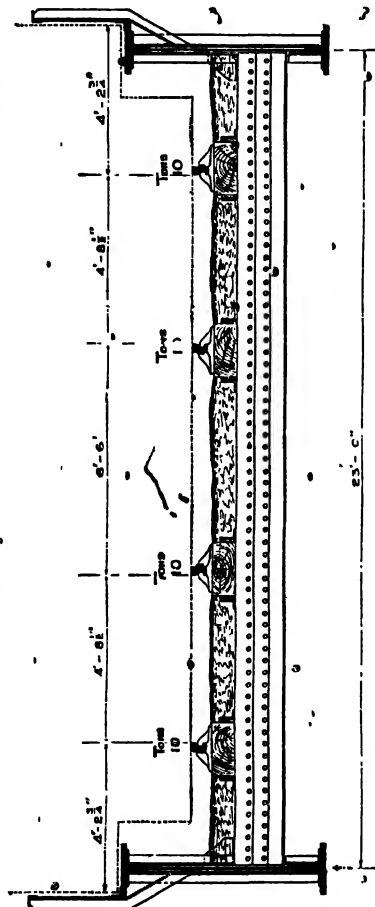
Total 256.94

Modulus of 4 Widths "C" = $4 \times 13.5 = 54$.

Stress = $\frac{256.94}{54} = 4.75$ Tons per square inch.

DORMAN, LONG & CO. LIMITED

APPLICATION OF "E MAX." SECTION TO DOUBLE LINE RAILWAY.



STRENGTH OF FLOOR AS SHOWN ABOVE.

Live Load (wheel load 10 Tons) distributed over 2 Widths.
"C" = 6ft. 0in.

Dead Load per square foot = 206lbs.

Total Dead Load on
2 Widths "C" = $\frac{23' \times 6' \times 206}{2240} = 12.69$ Tons.

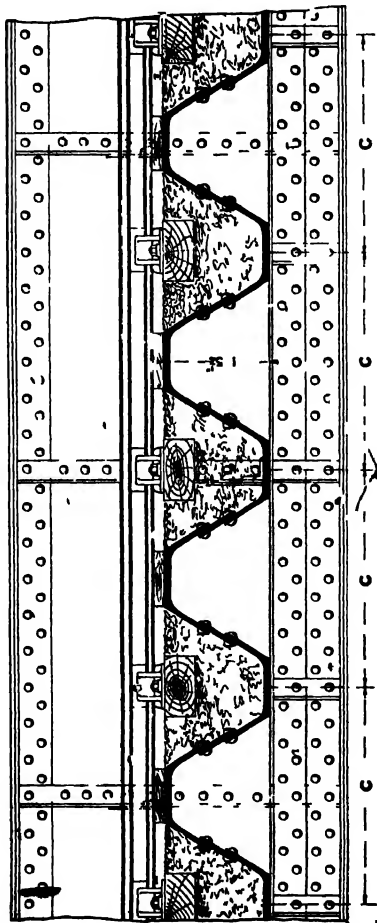
Bending Moment
due to Live Load = $(20 \times 8 \cdot 33 - 10 \times 5) 12' = 1411 \cdot 2$ inch tons
Bending Moment due to Dead Load = $12 \cdot 69 \times 23' \times 12 = 437 \cdot 8$ " "

Total 1849.0

Modulus of 2 Widths "C" = $2 \times 203 \cdot 87 = 407 \cdot 74$.

Stress = $\frac{1849 \cdot 0}{407 \cdot 74} = 4 \cdot 53$ Tons per square inch.

APPLICATION OF "E MAX." SECTION TO DOUBLE LINE RAILWAY WITH CROSS SLEEPERS.



STRENGTH OF FLOOR IS SHOWN ABOVE FOR 25 0 SPAN

Live Load (wheel load 10 Tons) distributed over 2 Widths
"C" = 6 ft 0 in

Dead Load per square foot = 131 5 lbs

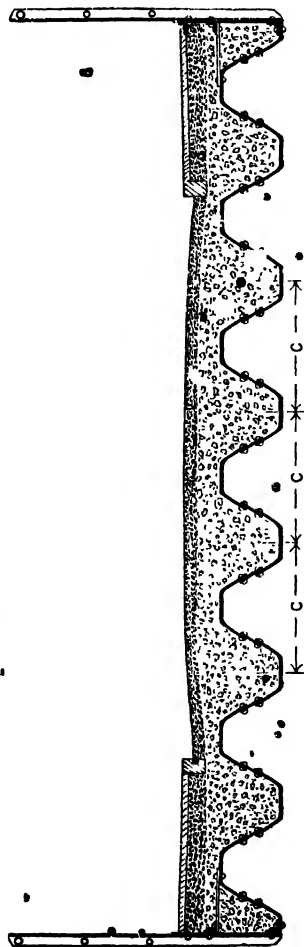
Total Dead Load on
2 Widths "C" = $\frac{25 \times 6 \times 131.5}{2240} = 8.8$ Tons

Bending Moment
due to Live Load 140 9 38-10 5) 12 -1651 2 inch tons
Bending Moment 8 8 25 12
due to Dead Load 8
Total 1981 2 " "

Modulus of 2 Widths C = $2 \times 203.87 = 407.74$

Stress = $\frac{1981.2}{407.74} = 4.85$ Tons per square inch

APPLICATION OF "E MAX." SECTION TO PUBLIC ROAD BRIDGE.



STRENGTH OF FLOOR AS SHEWN ABOVE FOR 35' 0" SPAN.

Live Load—Traction Engine 15 Tons, and Loaded Wagon of 32 Tons, distributed over 3 Widths "C" = 9ft. 6in.

Dead Load per square foot = 217lbs.

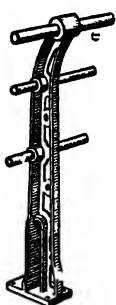
Total Dead Load = $\frac{35' \times 9' \times 217}{2240}$ = 30.51 Tons.

Maximum Bending Moment due to Live Load = 2388 inch tons
 Maximum Bending Moment due to Dead Load = $\frac{30.51 \times 35 \times 12}{8}$ = 1601
 Total 3989

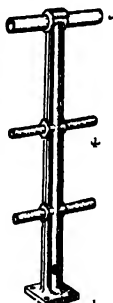
Modulus of 3 Widths "C" = 3×203.87 = 611.61.

Stress = $\frac{3989}{611.61}$ = 6.52 tons per square inch.

DORMAN, LONG & CO., LIMITED.



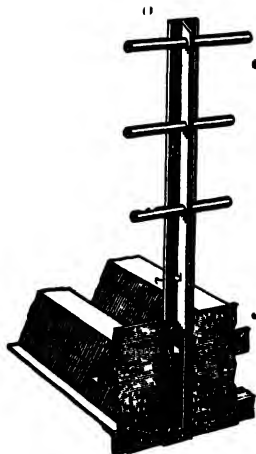
A



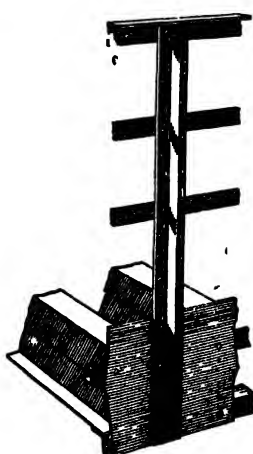
B



C



D



E

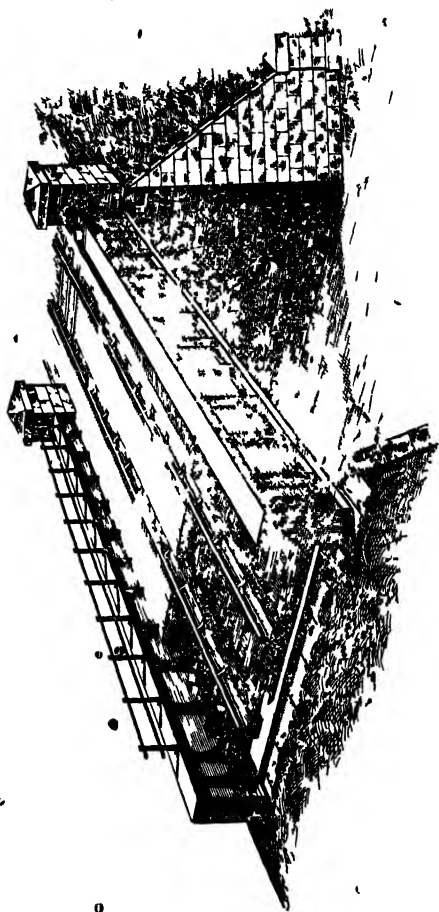
TYPES OF HAND RAILING.

DORMAN, LONG & CO. LIMITED.



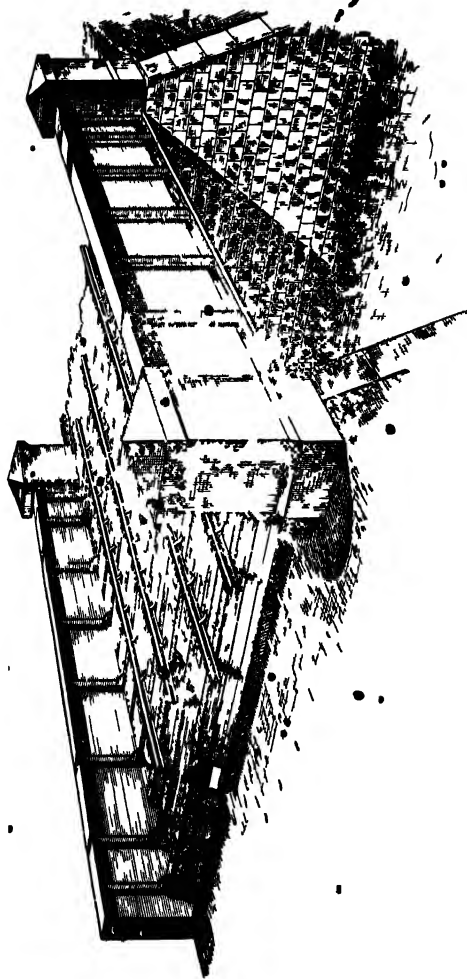
TYPE OF DECK SPAN FOR DOUBLE LINE RAILWAY.

DORMAN, LONG & CO LIMITED.



TYPE OF THROUGH SPAN FOR SINGLE LINE RAILWAY

DORMAN, LONG & CO LIMITED.



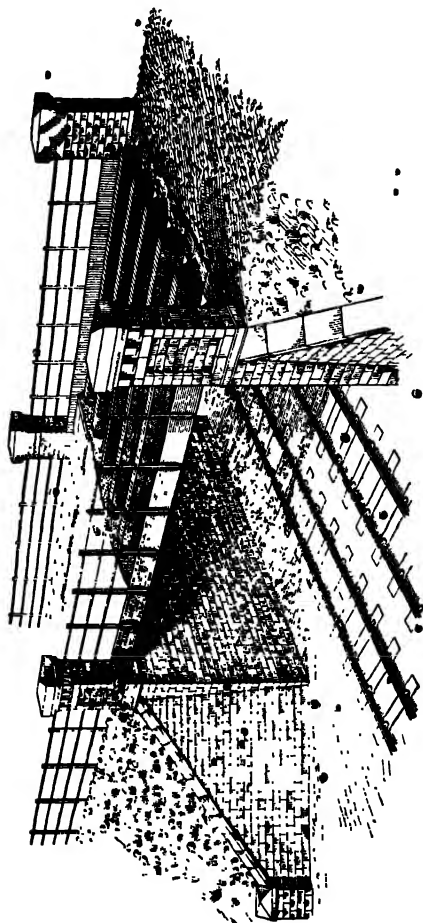
TYPE OF THROUGH SPAN FOR DOUBLE LINE RAILWAY

DORMAN, LONG & CO LIMITED.



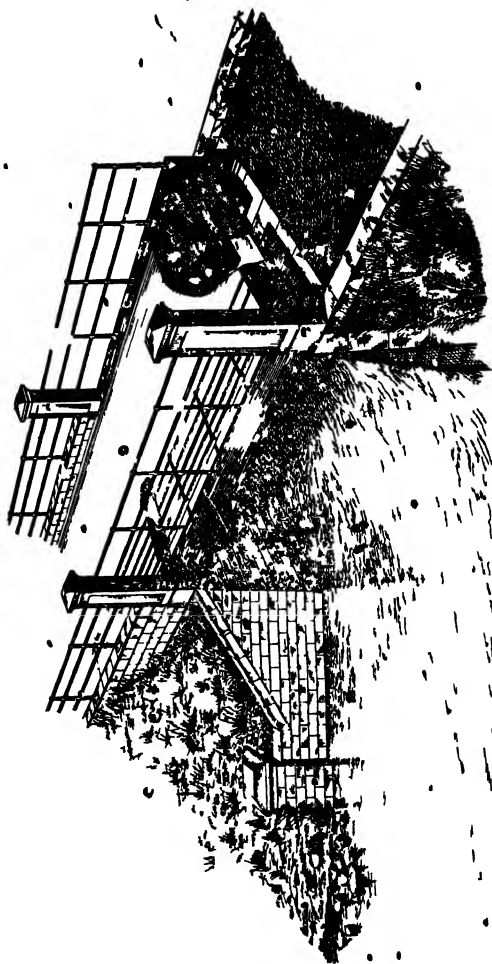
TYPE OF PUBLIC ROAD BRIDGE OF LARGE SPAN

DORMAN, LONG & CO. LIMITED



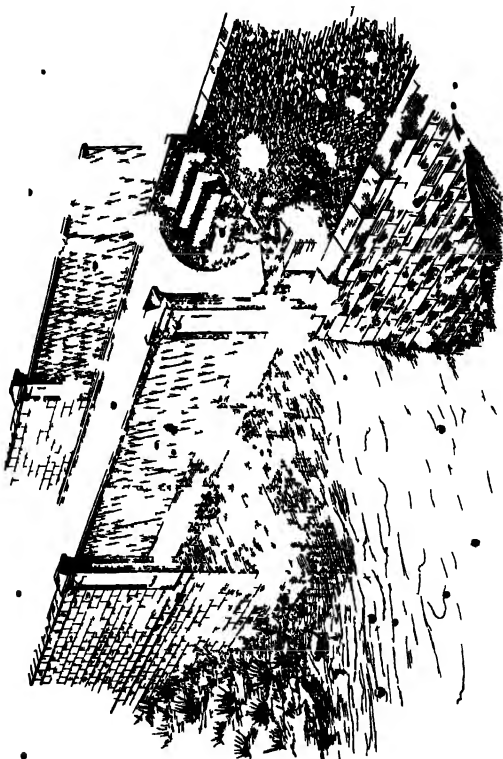
TYPE OF PUBLIC ROAD BRIDGE WITHOUT MAIN GIRDERS.

DORMAN, LONG & CO, LIMITED



TYPE OF HIGHWAY BRIDGE

DORMAN, LONG & CO. LIMITED



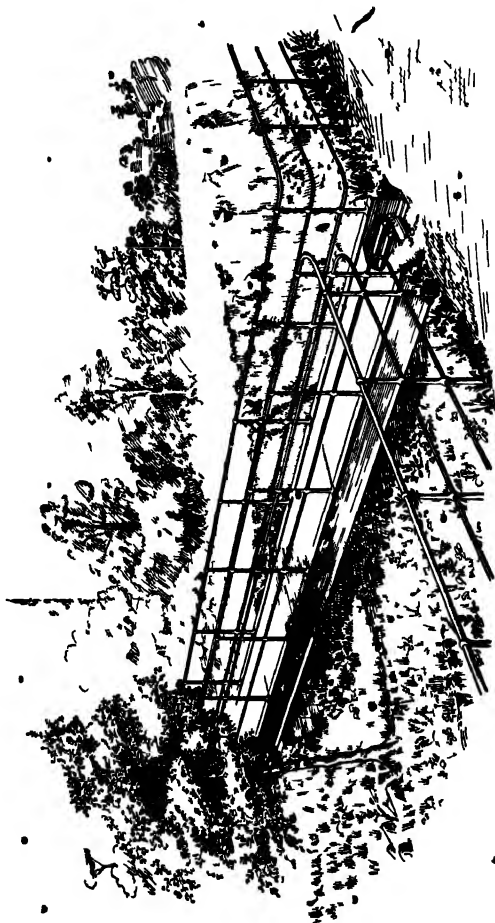
TYPE OF HIGHWAY BRIDGE.

DORMAN, LONG & CO. LIMITED.



TYPE OF LIGHT CARRIAGE BRIDGE.

DORMAN, LONG & CO. LIMITED



TYPE OF FOOT BRIDGE

DORMAN, LONG & CO. LIMITED

TELEGRAMS: "NAMROD, MIDDLESBROUGH."

SHEET DEPARTMENT

AYRTON ROLLING MILLS,
MIDDLESBROUGH,
ENGLAND.

ROLLING MILLS WITH GALVANIZING AND
CORRUGATING SHOPS.

STEEL AND IRON SHEETS.

Corrugated, Curved and Plain.

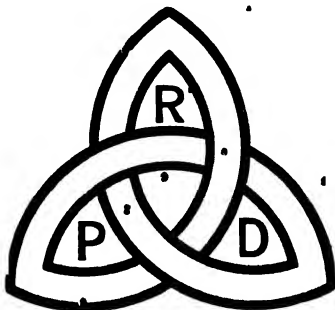
REQUISITE FITTINGS OF ALL DESCRIPTIONS.

LONDON OFFICE:
23 LEADENHALL STREET, E.C.

TELEGRAMS:
"TREFILEUR, LONDON."

DORMAN, LONG & CO. LIMITED.

BRANDS.



LYRE BIRD.



BRAND



DIAMOND

DORMAN, LONG & CO. LIMITED.

APPROXIMATE NUMBER OF GALVANIZED
CORRUGATED SHEETS PER TON.

Size	Corrugation	5'	5½'	6	6½'	7'	7½'
16 B. G.	8 3/4"	70	84	58	54	50	47
"	10 3/4"	59	54	49	45	42	39
18 B. G.	5 5/8"						
"	8 3/4"	86	78	72	66	62	57
"	6 1/4"						
"	7 1/4"	76	70	64	59	54	51
"	6 5/8"						
"	10 3/4"	74	67	62	56	53	50
20 B. G.	8 3/4"						
"	6 1/4"	114	104	95	88	81	76
"	7 1/4"	97	89	81	75	70	65
"	10 3/4"	95	86	79	73	68	64
22 B. G.	8 3/4"	139	127	116	107	99	93
"	10 3/4"	116	105	97	90	83	78
24 B. G.	8 3/4"	168	153	140	130	120	112
"	9 3/4"	154	140	128	119	110	103
"	10 3/4"	140	128	117	108	100	94
26 B. G.	8 3/4"	223	203	186	172	159	149
"	9 3/4"	204	186	170	157	146	136
"	10 3/4"	186	169	155	143	133	124
28 B. G.	8 3/4"	240	219	200	185	172	161
"	9 3/4"	220	200	183	169	158	147
"	10 3/4"	200	182	167	154	143	133

Flat Sheets 30" wide count the same as 8 3/4" corrugation, and 36" wide same as 10 3/4" corrugation.

DORMAN, LONG & CO. LIMITED.

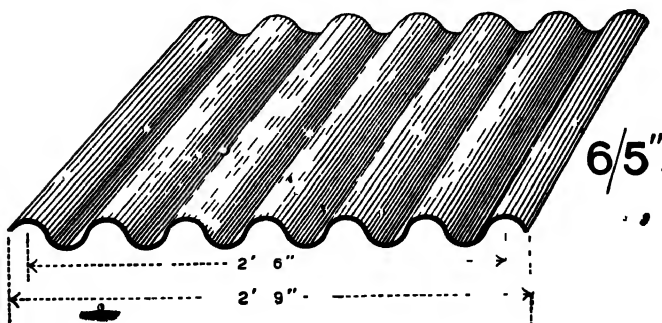
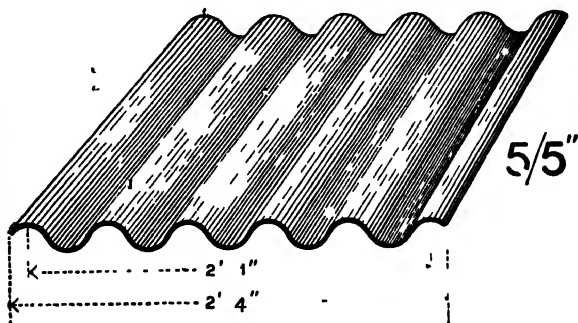
APPROXIMATE NUMBER OF GALVANIZED
CORRUGATED SHEETS PER TON.

8	8½	9	9½	10	11	12'	Corru- tion	Size
44				0			2 3 / 5 3 /	16 B G
37							10 3 / 6 3 /	"
54	51	48	45	43			5/5	18 B G.
							8/3	"
48	45	42	40	38			6 4	"
46	43	41	39	37			7 4	"
							8 5	"
71	67	63	60	57			10 3 /	"
							8/3	20 B G.
61	57	54	51	49			6/4	"
59	56	53	50	47			7/4	"
87	82	77	73	69	63		10/3"	"
73	68	65	61	58			8/3	22 B. G.
100	98	93	88	84	76	70	10/3	"
96	90	85	81	77			8/3	24 B. G.
88	83	78	74	70			9/3	"
139	131	124	117	111			10/3'	"
127	120	113	107	101			8/3	26 B. G.
116	109	103	98	93			9/3	"
150							10/3'	"
137							8/3"	28 B. G.
125							9/3'	"
							10/3"	"

Flat Sheets 30" wide count the same as 8/3" corrugation, and 36" wide
same as 10/3" corrugation.

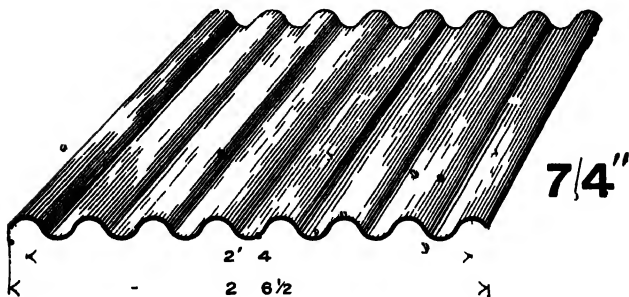
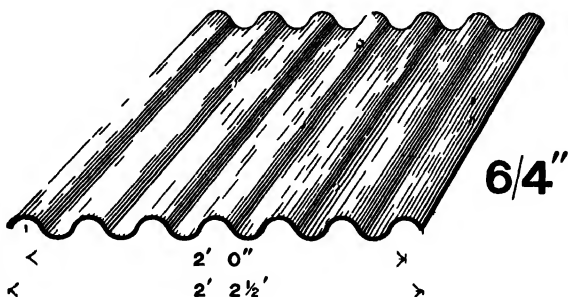
DORMAN, LONG & CO. LIMITED.

CORRUGATED SHEETS.



GAUGES 16, 18 AND 20 B.G.

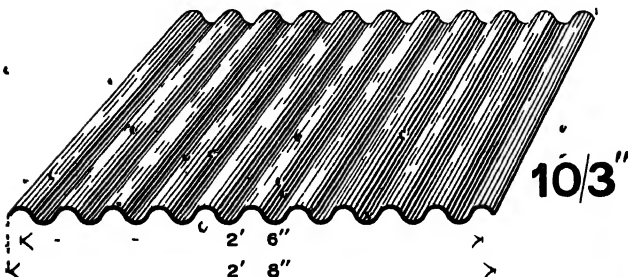
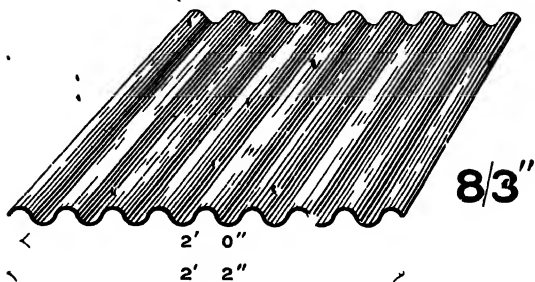
CORRUGATED SHEETS.



GAUGES 16, 18 AND 20 B.G.

DORMAN, LONG & CO. LIMITED.

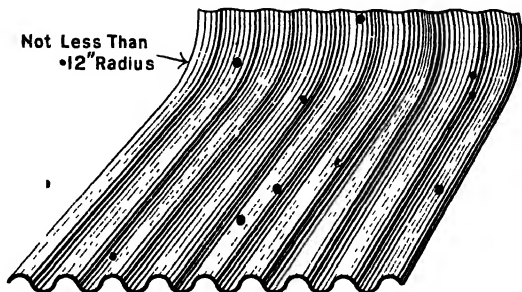
CORRUGATED SHEETS.



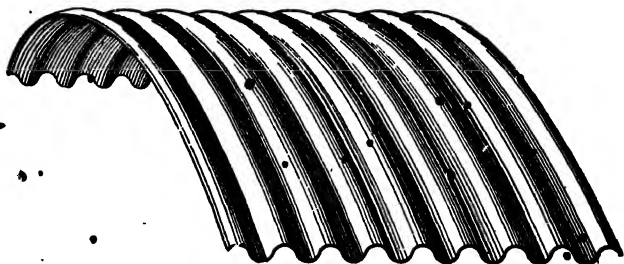
GAUGES 16, 18, 20, 22, 24, 26 AND 28 B.G.

DORMAN, LONG & CO. LIMITED.

CURVED CORRUGATED SHEETS.



8/3" OR 10/3". FROM 16 TO 26 GAUGE.
 5/5" .. 6/5" .. 16" .. 20" ..



8/3" OR 10/3". FROM 16 TO 26 GAUGE.
 5/5" .. 6/5" .. 16" .. 20" ..

DORMAN, LONG & CO. LIMITED.

GALVANIZED GUTTERS AND DOWN PIPES.
GAUGE 16 TO 26.

SOCKET



ANGLE



HALF ROUND



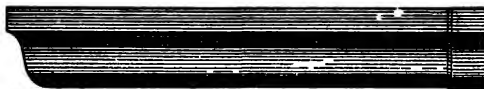
STOP END



GIRTH 10 TO 36

LENGTH ABOUT 6 0

O G GUTTER



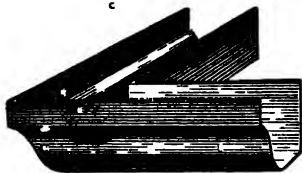
SECTION



GIRTH 10' TO 36"

LENGTH ABOUT 6 0'

ANGLE



STOP END



SOCKET



DORMAN, LONG & CO LIMITED.

GALVANIZED GUTTERS AND DOWN PIPES.

BEADED GUTTER



GIRTH 10 TO 36" GAUGE 24 LENGTH ABOUT 6'

MOULDED O G ANGLE

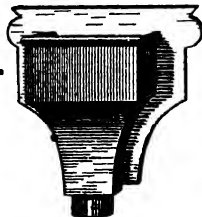


STAMPED O G GUTTER, WITH SLIP JOINTS SECTION



GIRTH 10 TO 36 GAUGE 24 LENGTH ABOUT 6'

FOUNTAIN HEAD



DOWN PIPE



DIAMETER 3 TO 12 GAUGE 20 TO 26
LENGTH ABOUT 8'
16 & 18 GAUGE IN SHORTER LENGTHS

SHOE



DORMAN, LONG & CO LIMITED.

GALVANIZED RIDGES AND LOUVRE BLADES.



Girth 12' to 36 Gauge 16 to 26 Length about 6' 0"



Girth 12 to 36 Gauge 16 to 26 Length about 6' 0"



16 Gauge up to $\frac{1}{8}$ thick maximum length 6 0
Under 16 Gauge, , 8 0



Girth 11 - 16 Gauge up to $\frac{1}{8}$ thick, maximum length 6 0
Under 16 Gauge, , , 8 0



Girth 11". - 16 Gauge up to $\frac{1}{8}$ " thick, maximum length 6' 0 .
Under 16 Gauge, , , 8' 0"

DORMAN, LONG & CO. LIMITED.

GALVANIZED FITTINGS.



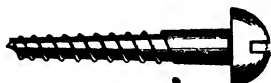
Weight of Rivets.

 $\frac{3}{8}$ " \times $\frac{1}{4}$ " - 57 Gross to 1 cwt. $\frac{1}{2}$ " \times $\frac{1}{4}$ " - 52 " " $\frac{5}{8}$ " \times $\frac{1}{4}$ " - 48 " "

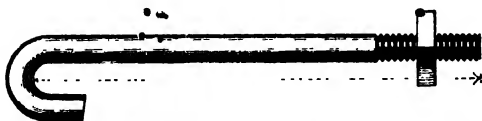
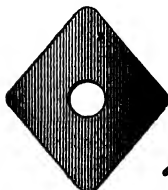
Weight of Bolts and Nuts.

 $1\frac{1}{4}$ " \times $\frac{1}{4}$ " - 24 Gross to 1 cwt. $1\frac{1}{2}$ " \times $\frac{1}{4}$ " - 22 " " $\frac{3}{4}$ " \times $\frac{1}{4}$ " - 31 " " $\frac{1}{2}$ " \times $\frac{1}{4}$ " - 32 " " $2\frac{1}{2}$ " - 22 Gross to 1 cwt.

3" - 13 " "

 $2\frac{1}{4}$ " - 24 Gross to 1 cwt. $2\frac{1}{2}$ " - 21 " "

3" - 16 " "

4" \times $\frac{5}{16}$ " diameter - $5\frac{1}{2}$ Gross to 1 cwt. $4\frac{1}{2}$ " \times $\frac{5}{16}$ " " - 5 " "5" \times $\frac{5}{16}$ " " - $4\frac{1}{2}$ " "4" \times $\frac{3}{8}$ " " - 4 " " $4\frac{1}{2}$ " \times $\frac{3}{8}$ " " - $3\frac{1}{2}$ " "5" \times $\frac{3}{8}$ " " - 3 " "

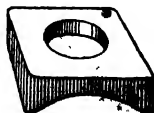
18 Gross to 1 cwt.



Curved

For $\frac{1}{4}$ " Rivets
and Nails:

57 Gross to 1 cwt. 11 Gross to 1 cwt.



DORMAN, LONG & CO. LIMITED.

TELEGRAMS: "RODS, MIDDLESBROUGH."

WIRE & ROD DEPARTMENT

CLEVELAND WIRE WORKS,
MIDDLESBROUGH,
ENGLAND.

ROLLING MILLS, WIRE DRAWING,
AND
GALVANIZING SHOPS.

LONDON OFFICE:
23 LEADENHALL STREET, E.C.

TELEGRAMS:
"TREFILEUR, LONDON."

DORMAN, LONG & CO. LIMITED.

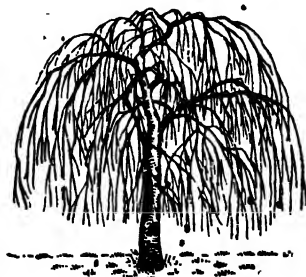
THE
CLEVELAND WIRE MILLS

MANUFACTURE

ALL KINDS OF WIRE FOR ALL PURPOSES.

Wire Rods Rolled or drawn to any size or length, to specification.

Cwt. Pieces, without Weld or Joint, guaranteed if required.



TRADE MARK:
"WILLOW TREE" BRAND
REGISTERED.

SPECIAL MAKE OF PATENT AND PLOUGH
STEEL ROPE WIRE,

DORMAN, LONG & CO. LIMITED.

THE CLEVELAND WIRE MILLS.

SPECIALITIES :

Galvanized Telegraph (High Conductivity) Wire.

Galvanized Telephone Wire.

Signal Strand etc.

Galvanized Patent Steel Hawser Wire to Lloyd's
specification.

Bright Patent and Plough Steel Rope Wire of all grades
and of Highest Tensile Strength and Ductility.




DRAWN AND ANNEALED PIT GUIDE RODS,
WELDS GUARANTEED.

The Cleveland Wire Mills are also makers of
all kinds of

IRON, STEEL & CHARCOAL WIRE OF ALL
SIZES & GRADES FOR ALL PURPOSES.

DORMAN, LONG & CO. LIMITED.

GALVANIZED STEEL BARB FENCING WIRE.

Style	Description	Weight of		Length of 11 lbs. or 51 Kilos
		100 yds.	Mile	
		lbs.	lbs.	
	2 Point Ordinary Barbs round One Wire only, 5in. apart	19	335	589 yards 539 metres
	2 Point Thickset Barbs round One Wire only 2½in. apart	21	350	533 yards 487 metres
	4 Point Ordinary Barbs round One Wire only, 6in. apart	20	352	560 yards 512 metres
	4 Point Thickset Barbs round One Wire only, 3in. apart	25	440	448 yards 410 metres
	4 Point Ordinary Barbs round Both Wires, 6in. apart	20	352	560 yards 512 metres
	4 Point Thickset Barbs round Both Wires, 3in. apart	25	440	448 yards 410 metres

DORMAN, LONG, & CO LIMITED.

GALVANIZED FENCING STRAND.

THREE PLY				FIVE PLY			
Gauge	Size of Single Wire	Weight per Mile Lbs	Length per Cwt Yards	Gauge	Size of Single Wire	Weight per Mile Lbs	Length per Cwt Yards
0	8	1100	179	0	10 1/2	1070	184
1	8 1/2	994	198	1	11 1/2	870	226
2	9	800	246	2	12	778	253
3	10	704	280		13	607	324
4	11	580	340	4	13 1/2	530	372
5	12	466	423	5	14	460	428
6	12 1/2	414	476	6	15	372	530
7	13 1/4	340	580	7	16	294	670
8	14	275	717	8	16 1/2	250	788
9	15	223	884	9	17	225	876
10	16	176	1120	10	18	165	1194
FOUR PLY				SEVEN PLY			
1	9 1/2	1063	185	1	7 1/2	2840	69
2	10 1/2	855	231	"	9	2085	95
3	11	773	255	0	11 1/2	1211	162
4	12	620	318	"	12	1085	182
5	12 1/2	552	356	1	12 1/2	963	205
6	13 1/4	454	434	2	13	850	232
7	14	367	537	3	13 1/2	741	266
8	14 1/2	330	593	4	14 1/4	610	323
9	15 1/2	265	743	5	15	520	379
10	16 1/4	220	896	6	16	410	481
	17	180	1095	7	16 1/2	351	560
				8	17 1/4	292	675
				9	18	230	853
				10	18 1/2	195	1011

DORMAN, LONG & CO LIMITED.

IMPERIAL STANDARD WIRE GAUGE.

TABLE OF SIZES WEIGHTS LENGTHS AND BREAKING STRAINS OF STEEL WIRE.

As adopted by the Iron and Steel Wire Manufacturers Association - January 1904

Diameter Inches	Size on Wire Gauge	Diameter		Sectional area in square inches	Approximate weight of			Approximate length of		Approximate breaking strain	
		Deol of an inch	Milli- metres		100 Yards	1 Mile	Kilo metres	Owt	100 K lbs	25 Tons per sq in	35 Tons per sq in
1/8	7 0	500	12 7	196 5	0 11 3	118	2188	56	110	10395	15393
	6 0	464	11 8	16 10	17 2	3033	1833	65	128	9469	13257
	5 0	432	11 0	14 57	14 3	2 3	1634	75	147	8208	11490
	4 0	400	10 2	2563	12	4	1400	75	172	7035	9851
	3 0	372	9 4	10 369	1 1	1 5 1	1211	101	198	6096	8521
1/4	3 8	348	8 8	0 110	6 3	1 1	106	115	226	5326	7457
	1 0	324	8 2	0 244	4 03	147 3	313	133	261	4616	6463
	2	300	7 6	0	7 04	1268	3	155	305	3958	5547
	1	276	7 0	0 33	60 17	1 73	667	103	360	3370	4693
	3	252	6 4	0 437	0 65		555	220	433	2792	3310
3/8	4	232	5 9	0 477	4 07	7 38	471	260	512	2366	3313
	5	212	5 4	0 530	35 37	33	333	311	612	1977	2767
	6	192	4 9	0 396	23 43	518	323	380	740	1621	2269
	7	176	4 5	0 432	24 77	436	371	452	830	1362	1908
	9	160	4 1	0 011	20 45	360	224	546	1075	1125	1576
1/2	9	144	3 7	01 20	16 3	2 3	192	675	1329	911	1276
	10	128	3 3	01 267	11 12	231	143	934	1601	720	1008
	11	116	3 0	01037	10 30	190	11	1040	2047	592	828
	12	104	2 6	00350	9 63	152	9	1293	2545	473	666
	13	092	2 3	0036	6 76	113	74	1653	3 54	373	521
5/8	14	090	2 0	00503	5 11	90	5	2186	4303	281	394
	15	072	1 8	00407	4 15	73	45	2699	5313	227	318
	16	064	1 6	00322	3 23	58	36	3416	674	180	252
	17	056	1 4	00246	2 50	44	27 5	4462	8783	136	192
	18	048	1 2	00181	1 83	32 5	20 2	6073	11964	101	141
3/4	19	040	1 0	00126	1 27	22 54	14 0	8745	17214	70	98
	20	036	0 9	00102	1 03	18 25	11 34	10796	21251	57	79
	21	032	0 8	00080	819	14 42	8 96	13663	26894	45	63
	22	028	0 7	00062	628	11 04	6 86	17846	35128	34 4	48 2
	23	024	0 6	00045	461	8 11	5 04	24290	47813	25 2	35 3
1	24	024	0 55	00038	387	6 82	4 24	28908	56903	21 2	29 8
	25	020	0 5	00031	320	5 63	3 5	34978	68851	17 6	24 6
	26	018	0 45	00025	259	4 56	2 84	43184	85003	14 2	19 9
	27	0164	0 4	00021	215	3 79	2 35	52021	102498	11 8	16 6
	28	0148	0 37	00017	175	3 09	1 92	63877	125735	9 6	13 5
1 1/8	29	0136	0 35	00014	148	2 61	1 62	75646	148903	8 1	11 4
	30	0124	0 32	00012	123	2 17	1 35	90996	179112	6 8	9 5

DORMAN, LONG & CO. LIMITED.

TABLE OF TENSILE STRAIN OF WIRE.

From 3 to 126 Inch for 1 Ton per Square Inch for each
One Thousandth Part of an Inch.

TENSILE OF WIRE IN LBS. FOR 1 TON (2240 LBS.) PER EACH 1000 INCH.

Dec.	Lbs.	Dec.	Lbs.	Dec.	Lbs.	Dec.	Lbs.	Dec.	Lbs.
3	158.3	265	123.6	23	93.1	195	67.	16	45.
299	157.3	264	122.6	229	92.3	194	66.2	15.9	44.5
298	156.2	263	121.7	228	91.5	193	65.6	15.8	43.9
297	155.2	262	120.8	227	90.7	192	64.9	15.7	43.4
296	154.2	261	119.8	226	89.9	191	64.2	15.6	42.8
295	153.1	26	118.9	225	89.01	19	63.6	15.5	42.3
294	152.1	259	118.	224	88.2	189	62.9	15.4	41.7
293	151.	258	117.1	223	87.51	188	62.2	15.3	41.2
292	150.	257	116.2	222	86.7	187	61.5	15.2	40.6
291	149	256	115.3	221	85.9	186	60.9	15.1	40.1
29	147.9	255	114.4	22	85.1	185	60.2	15	39.6
289	146.9	254	113.5	219	84.3	184	59.5	14.9	39.
288	145.9	253	112.6	218	83.6	183	59	14.8	38.5
287	144.9	252	111.7	217	82.84	182	58.3	14.7	38.
286	143.9	251	110.8	216	82.1	181	57.7	14.6	37.5
285	142.9	25	110.1	215	81.3	18	57.	14.5	37.
284	141.9	249	109.1	214	80.6	179	56.4	14.4	36.5
283	140.9	248	108.2	213	79.8	178	55.7	14.3	36.
282	139.9	247	107.3	212	79.	177	55.2	14.2	35.5
281	138.9	246	106.4	211	78.3	176	54.5	14.1	35.
28	137.9	245	105.6	21	77.6	175	53.8	14	34.5
279	136.9	244	104.7	209	76.9	174	53.3	13.9	34.
278	135.9	243	103.9	208	76.2	173	52.7	13.8	33.5
277	135.	242	103.	207	75.4	172	52.	13.7	33.
276	134.1	241	102.	206	74.7	171	51.5	13.6	32.5
275	133.	24	101.1	205	73.9	17	50.9	13.5	32.
274	132.1	239	100.51	204	73.2	169	50.2	13.4	31.6
273	131.1	238	99.71	203	72.5	168	49.6	13.3	31.1
272	130.2	237	98.8	202	71.8	167	49.	13.2	30.7
271	129.2	236	98.	201	71.	166	48.5	13.1	30.2
27	128.2	235	97	2	70.4	165	47.9	13	29.7
269	127.3	234	96.3	199	69.7	164	47.3	12.9	29.3
268	126.3	233	95.5	198	69.	163	46.7	12.8	28.8
267	125.4	232	94.7	197	68.3	162	46.2	12.7	28.4
266	124.4	231	93.9	196	67.6	161	45.6	12.6	28.

DORMAN, LONG & CO. LIMITED.

TABLE OF TENSILE STRAIN OF WIRE.

From .125 to .001 Inch for 1 Ton per Square Inch for each
One Thousandth Part of an Inch.

TENSILE OF WIRE IN LBS. FOR 1 TON (2,240 LBS.) PER EACH THOUSANDTH INCH.

Decl.	Lbs.	Decl.	Lbs.	Decl.	Lbs.	Decl.	Lbs.	Decl.	Lbs.
.125	27.5	.1	17.6	.075	9.9	.05	4.4	.025	1.1
.124	27	.099	17.24	.074	9.6	.049	4.2	.024	1.014
.123	26.6	.098	16.9	.073	9.4	.048	4.0	.023	.93
.122	26.2	.097	16.6	.072	9.1	.047	3.8	.022	.85
.121	25.8	.096	16.2	.071	8.9	.046	3.7	.021	.775
.12	25.3	.095	15.9	.07	8.6	.045	3.55	.02	.7
.119	24.9	.094	15.55	.069	8.4	.044	3.4	.019	.635
.118	24.5	.093	15.2	.068	8.1	.043	3.25	.018	.57
.117	24.1	.092	14.9	.067	7.9	.042	3.12	.017	.508
.116	23.7	.091	14.6	.066	7.7	.041	2.95	.016	.45
.115	23.3	.09	14.3	.065	7.4	.04	2.8	.015	.396
.114	22.9	.089	13.9	.064	7.2	.039	2.7	.014	.3448
.113	22.5	.088	13.6	.063	7	.038	2.56	.013	.297
.112	22.1	.087	13.3	.062	6.8	.037	2.4	.012	.253
.111	21.7	.086	13	.061	6.5	.036	2.3	.011	.2128
.11	21.3	.085	12.7	.06	6.33	.035	2.16	.01	.176
.109	20.9	.084	12.4	.059	6.1	.034	2.04	.009	.1425
.108	20.5	.083	12.1	.058	5.9	.033	1.93	.008	.1125
.107	20.1	.082	11.8	.057	5.7	.032	1.8	.007	.0862
.106	19.7	.081	11.5	.056	5.5	.031	1.7	.006	.0633
.105	19.4	.08	11.26	.055	5.3	.03	1.58	.005	.04398
.104	19	.079	11	.054	5.1	.029	1.48	.004	.02815
.103	18.7	.078	10.7	.053	4.9	.028	1.38	.003	.01583
.102	18.3	.077	10.4	.052	4.8	.027	1.28	.002	.007
.101	17.9	.076	10.16	.051	4.6	.026	1.188	.001	.00176

NOTE.- To explain the application of the above table, the following illustration will suffice:—

Required to know the breaking strain of any wire the section of which is comprised within the limits of .3 and .001 diameter of section of wire. Find the breaking strain by usual test. Let it be supposed .084. If the wire breaks at 620lbs. strain, find in the table, opposite .084, the figures in the column headed "lbs." 12.4. Use these as a divider: $620 \div 12.4 = 50$ tons.

DORMAN, LONG & CO. LIMITED.

TELEGRAMS: "DORMAN, PORT CLARENCE."

CLARENCE STEEL WORKS AND ROLLING MILLS

PORT CLARENCE.

OPEN HEARTH STEEL.

SPECIALITIES:

High-Class Steels in all qualities.

Hard Steel with Carbon up to 1.5 per cent., for Wire Ropes, Springs, Picks, Saws, Tools, Files, etc.

Steel to stand Admiralty, War Office, Board of Trade, Lloyd's, and other Special Tests.

Conductivity Steel to stand General Post Office, India Office, and British Railway Tests.

ROLLED SECTIONS.

Billets, Blooms, Slabs, Tin Bars, Flats, Angles and Rails to British Standard and other Special Sections.

DORMAN, LONG & CO. LIMITED.

OPEN HEARTH STEEL

Manufactured and Rolled at Clarence Steelworks.

INGOTS

Description	Size	Weight
	Inches	Cwts.
Octagon Fluted	$26\frac{1}{2} \times 24\frac{1}{2}$	100/110
" "	$27 \times 23\frac{1}{2}$	100/115
" "	$24\frac{1}{2} \times 20\frac{1}{2}$	100/110
" "	$22 \times 18\frac{1}{2}$	75/85
" "	20×17	55/65
Hexagon	22×20	60/65
Rectangular	24×20	60/65
"	21×17	35/46
"	$16\frac{1}{2} \times 14\frac{1}{2}$	28/30
Square	18	35/42
"	17	30/36
"	16	29/32
"	$14\frac{1}{2}$	25
"	12	17
Slab	$33 \times 11\frac{1}{2}$	40/60

All Measurements taken across the Flats.

DORMAN, LONG & CO. LIMITED.

OPEN HEARTH STEEL

Manufactured and Rolled at Clarence Steelworks.

BLOOMS

Inches	Inches	Inches	Inches
10 × 8	8 × 7	7 × 6	6 × 5
8 × 8½	7 × 7	6 × 6	

BILLETS

Inches	Inches	Inches	Inches
5½ × 5½	4 × 4	3 × 3	2¼ × 2¼
5 × 5	3½ × 3½	2¾ × 2¾	2 × 2
4½ × 4½	3¼ × 3¼	2½ × 2½	1½ × 1½

SLABS

Inches	Inches	Inches	Inches
7 × 4½	7 × 2½	7 × 1½	6 × 3½
7 × 3½	7 × 2	6 × 4¼	6 × 3
			6 × 2

FLATS

Inches	Inches	Inches	Inches	Inches	Inches	Inches
7 × 1¾	7 × ¾	6 × 2	6 × 1½	6 × 1	5 × 2	4 × 2
7 × 1¼	7 × ¾	6 × 1¾	6 × 1¾	6 × ¾	5 × 1¾	4 × 1¾
7 × 1½	7 × ¾	6 × 1¾	6 × 1¼	6 × ¾	5 × 1½	4 × 1½
7 × 1		6 × 1½	6 × 1½	6 × ¾	5 × 1¼	4 × 1¼

TINPLATE BARS, TAPER EDGES

Inches	Inches	Inches	Inches
7½ × 1	7½ × 1½	7½ × ¾	7½ × 1½
7½ × 1½	7½ × ¾	7½ × ¾	7½ × 1½
7½ × ¾	7½ × 1½	7½ × ½	

DORMAN, LONG & CO. LIMITED.

GENERAL INFORMATION,
FORMULÆ, TABLES, ETC.

DORMAN, LONG & CO. LIMITED.

GENERAL FORMULAE FOR THE FLEXURE OF BEAMS

A = area of section in square inches

L = length of span in feet

l = length of span in inches

W = total distributed load in tons

f = safe stress in tons per square inch, in extreme fibres of beam

d = total depth of cross section in inches

y = distance in inches of outermost fibre from neutral axis (in a symmetrical section $y = \frac{d}{2}$)

M = maximum bending moment in inch tons

D = maximum deflection in inches

I = greatest moment of Inertia about the neutral axis (passing through the centre of gravity of section)

I_p = moment of Inertia about an axis parallel to above, but not passing through the centre of gravity

v = distance in inches between these axes

Z = section modulus

r = radius of gyration in inches

E = modulus of elasticity (assumed at 12,000 tons per square inch for steel)

$$Z = \frac{I}{y} \quad I_p = I + A.v^2 \quad r = \sqrt{\frac{I}{A}}$$

$$M = \frac{f.I}{y} = f.Z \quad f = \frac{M.y}{I} = \frac{M}{Z}$$

For a beam supported at both ends and uniformly loaded, $W = \frac{8 \times f \times Z}{l \times y} = \frac{8 \times f \times I}{l \times y^3}$

(I) $D = \frac{5 W.l^3}{384 E.I}$ for beams of uniform section, supported at both ends and uniformly loaded

(II) $D = \frac{P.l^3}{48 E.I}$ for beams of uniform section, supported at both ends and loaded with a single load, P, at centre of span

(III) $D = \frac{W.l^3}{8 E.I}$ for beams of uniform section fixed at one end and supported at the other, and uniformly loaded

(IV) $D = \frac{P.l^3}{3 E.I}$ for beams of uniform section fixed at one end and unsupported at the other, and loaded with a single load, P, at the latter end

For girders with equal flanges and f taken at $7\frac{1}{2}$ tons per square inch, the deflection is as follows:—

$$(I) D = \frac{.01875 L^2}{d}; \quad (II) D = \frac{.015 L^2}{d}; \quad (III) D = \frac{.045 L^2}{d}; \quad (IV) D = \frac{.06 L^2}{d}$$

DORMAN, LONG & CO. LIMITED.

BENDING MOMENT, SHEAR AND DEFLECTION OF BEAMS UNDER VARIOUS SYSTEMS OF LOADING.

W = total load in tons.

I = moment of inertia.

E = modulus of elasticity, assumed at 12,000 tons per square inch for steel.

d = depth of beam in inches.

L = span in feet.

l = span in inches.

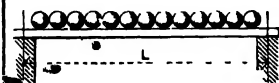
A = distance in feet.

a = same distance in inches.

B = distance in feet.

b = same distance in inches.

(1).—BEAM SUPPORTED AT BOTH ENDS AND HAVING AN UNIFORMLY DISTRIBUTED LOAD.



Safe load that given in the tables

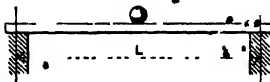
Maximum bending moment, in inch tons, at middle of span $\frac{W.l}{8} = \frac{3 W.L}{2}$

Maximum shear at points of support $\frac{W}{2}$

Maximum deflection in inches $= \frac{5 W.l^3}{384 E.I}$

Maximum deflection in inches, where flanges are equal and extreme fibre stress taken at $7\frac{1}{2}$ tons per square inch $= \frac{0.1875 L^2}{d}$

(2).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A CONCENTRATED LOAD IN THE MIDDLE.



Safe load = half that given in the tables for case (1).

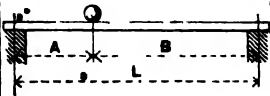
Maximum bending moment, in inch tons, at middle of span $= \frac{W.l}{4} = \frac{3 W.L}{4}$

Maximum shear between load and point of support $\frac{W}{2}$

Maximum deflection in inches $= \frac{W.l^3}{48 E.I}$

Maximum deflection in inches, where flanges are equal and extreme fibre stress taken at $7\frac{1}{2}$ tons per square inch $= \frac{0.116 L^2}{d}$

(3).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A CONCENTRATED LOAD AT ANY POINT.



Safe load = that given in the tables for case (1) $\frac{L^2}{8 A.B}$

Maximum bending moment, in inch tons, at point of application of load $= \frac{W.a.b}{L} = \frac{12 W.A.B}{L}$

Maximum shear between load and the nearer support $= \frac{W.B}{L}$ and between load and the other support $= \frac{W.A}{L}$

Maximum deflection, in inches $= \frac{W.a.b(2l^3 - 3l^2a - 3l^2b)}{96 E.I}$

Maximum deflection, in inches, where flanges are equal and extreme fibre stress taken at $7\frac{1}{2}$ tons per square inch $= \frac{2 L - A}{600 d} \sqrt{48 A(2L - A)}$

NOTE.—Care should be taken that the maximum shear, in the above cases, does not exceed half the maximum load given in the tables.

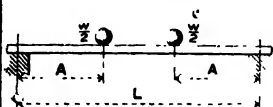
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BENDING MOMENT, SHEAR AND DEFLECTION OF BEAMS UNDER VARIOUS SYSTEMS OF LOADING.

W = total load in tons.
 I = moment of inertia.
 E = modulus of elasticity, assumed at 12,000 tons per square inch for steel.
 d = depth of beam in inches.

L = span in feet.
 l = span in inches.
 A = distance in feet.
 a = same distance in inches.
 B = distance in feet.
 b = same distance in inches.

(4).—BEAM SUPPORTED AT BOTH ENDS AND HAVING TWO EQUAL LOADS, $\frac{W}{2}$, CONCENTRATED AT EQUAL DISTANCES FROM CENTRE OF BEAM.



Safe load = that given in the tables for case (1) $\times \frac{1}{4A}$.

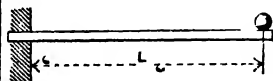
Maximum bending moment, in inch tons, between loads $= \frac{W \cdot a}{2} = 6 W \cdot A$.

Maximum shear between load and nearer support $= \frac{W}{2}$.

Maximum deflection, in inches $= \frac{W \cdot a}{48 E \cdot I} (3l^2 - 4a^2)$.

Maximum deflection, in inches, where flanges are equal and extreme fibre stress taken at $7\frac{1}{2}$ tons per square inch $= \frac{0075}{d} (3 L^2 - 4 A^2)$.

(5).—BEAM FIXED AT ONE END AND HAVING A CONCENTRATED LOAD AT THE FREE END.



Safe load = $\frac{1}{2}$ that given in the tables for case (1).

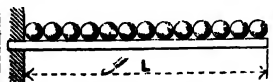
Maximum bending moment, in inch tons, at point of support $= W \cdot l = 12 W \cdot L$.

Maximum shear between load and point of support $= W$.

Maximum deflection, in inches $= \frac{W \cdot l^3}{3 E \cdot I}$.

Maximum deflection, in inches, where flanges are equal and extreme fibre stress taken at $7\frac{1}{2}$ tons per square inch $= \frac{006 L^2}{d}$.

(6).—BEAM FIXED AT ONE END AND HAVING AN UNIFORMLY DISTRIBUTED LOAD.



Safe load = $\frac{1}{4}$ that given in the tables for case (1).

Maximum bending moment, in inch tons, at point of support $= \frac{W \cdot l}{2} = 6 W \cdot L$.

Maximum shear at point of support $= W$.

Maximum deflection, in inches $= \frac{W \cdot l^3}{8 E \cdot I}$.

Maximum deflection, in inches, where flanges are equal and extreme fibre stress taken at $7\frac{1}{2}$ tons per square inch $= \frac{0045 L^2}{d}$.

NOTE.—Care should be taken that the maximum shear, in the above cases, does not exceed half the maximum load given in the tables.

DORMAN, LONG & CO. LIMITED.

BENDING MOMENT, SHEAR, DEFLECTION &c., OF BEAMS UNDER VARIOUS SYSTEMS OF LOADING.

W = total load in tons.

I = moment of inertia.

E = modulus of elasticity, assumed
at 12,000 tons per square inch
for steel.

d = depth of beam in inches.

D = distance in feet.

L = span in feet.

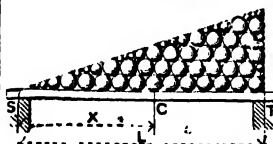
l = span in inches.

y = length in feet over which load
is distributed.

C = point at which maximum bend-
ing moment occurs.

x = distance in feet of C from
support S.

(7).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A DISTRIBUTED LOAD INCREASING, BY A UNIFORM INCREMENT, FROM ONE SUPPORT TO THE OTHER.



Safe load = $\cdot 9766 \times$ that given
in the tables for case (1),
 $\therefore = \cdot 5773 I..$

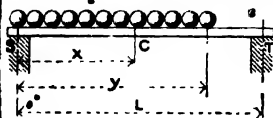
Maximum bending moment, in inch tons, at
point C = $\cdot 1283 W.l = 1\cdot 5396 W.L.$

Maximum shear at support T = $\frac{2}{3} W.$

Maximum deflection, in inches = $\cdot 013 \frac{W.l^3}{E.I.}$

Maximum deflection, in inches, where flanges
are equal and extreme fibre stress taken at
 $7\frac{1}{2}$ tons per square inch = $\frac{\cdot 01824 L^2}{d}.$

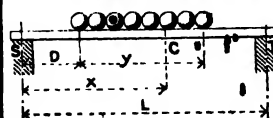
(8).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A LOAD UNIFORMLY DISTRIBUTED OVER A PORTION OF ITS LENGTH, EXTENDING FROM ONE SUPPORT.



Formula for finding the position of the point
C, at which the maximum bending moment
occurs.

$$x = y \left(1 - \frac{y}{2L} \right)$$

(9).—BEAM SUPPORTED AT BOTH ENDS AND HAVING A LOAD UNIFORMLY DISTRIBUTED OVER A PORTION OF ITS LENGTH, NOT EXTENDING TO EITHER SUPPORT.

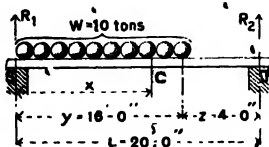


Formula for finding the position of the point
C, at which the maximum bending moment
occurs.

$$x = D + y \left(1 - \frac{2D + y}{2L} \right).$$

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BEAMS UNSYMMETRICALLY LOADED.



Example shewing how to find the size of a beam necessary to carry a load uniformly distributed over a portion of its length, and extending from one support, as shewn in diagram; the beam being supported at both ends and of uniform section throughout.

Assume that W is 10 tons, span 20' 0" and distance that load extends from one support is 16' 0".

Let R_1 = reaction at end, S, where load commences.

R_2 = reaction at other end, T.

C = point where maximum bending moment occurs.

x = distance in feet of C from end S.

P = distributed load on length x.

W_E = equivalent distributed load, over the whole beam, which would produce the same maximum bending moment as that caused by load W.

$$\text{Then } R_1 = \frac{W \left(\frac{y}{2} + z \right)}{L} = \frac{10(8 + 4)}{20} = 6 \text{ tons.}$$

$$R_2 = 10 - 6 = 4 \text{ tons.}$$

$$\text{From formula on previous page } x = y \left(1 - \frac{y}{2L} \right) = 16 \left(1 - \frac{16}{2 \times 20} \right) = 9.6 \text{ feet.}$$

$$P = \frac{W \cdot x}{y} = \frac{9.6 \times 10}{16} = 6 \text{ tons.}$$

$$\text{The maximum bending moment} = (R_1 \times x) - \left(P \times \frac{x}{2} \right) = 6 \times 9.6 - 6 \times 4.8 = 28.8 \text{ ft. tons.}$$

The maximum bending moment in ft. tons on a beam supported at both ends and having an uniformly distributed load, W_1 , is $\frac{W_1 \cdot L}{8}$.

$$\text{Therefore the equivalent distributed load } W_E \left. \vphantom{\begin{matrix} \\ \end{matrix}} \right\} = \frac{\text{Maximum bending moment in ft. tons} \times 8}{L}$$

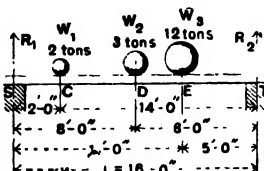
$$\text{Hence } W_E \text{ in this case} = \frac{28.8 \times 8}{20} = 11.52 \text{ tons.}$$

Reference to the table of safe distributed loads on beams will shew that B.S.B. 21 ($12'' \times 6'' \times 44 \text{ lbs.}$) is capable of carrying 13 tons at 20 feet span; and, as half the maximum load given in the table for this beam ($\frac{40}{2} = 20 \text{ tons}$) is greater than the maximum reaction R_1 (6 tons), this beam will meet the requirements.

DORMAN, LONG & CO. LIMITED.

BEAMS UNSYMMETRICALLY LOADED.

Example shewing how to find the size of a beam necessary to carry three loads concentrated at different points in its length, as shewn in diagram; the beam being supported at both ends, and of uniform cross section throughout.



Let W_1 , W_2 and W_3 be 3 concentrated loads of 2, 3 and 12 tons respectively.

R_1 = reaction at end S.

R_2 = reaction at end T.

W_E = equivalent distributed load over the whole beam which would produce the same maximum bending moment as that caused by ($W_1 + W_2 + W_3$).

$$\text{Then } R_1 = \frac{(12 \times 5) + (3 \times 8) + (2 \times 14)}{16} = 7 \text{ tons.}$$

$$R_2 = 12 + 3 + 2 - 7 = 10 \text{ tons.}$$

The maximum bending moment occurs at the point of application of one of the loads, and may be found as follows:—

$$\text{The bending moment at C} = R_1 \times 2 = 7 \times 2 = 14 \text{ ft. tons.}$$

$$\text{" " " D} = R_1 \times 8 - 2 \times 6 = 56 - 12 = 44 \text{ " " "}$$

$$\text{" " " E} = R_2 \times 5 = 10 \times 5 = 50 \text{ " " "}$$

Hence the maximum bending moment is at E, and = 50 ft. tons.

The maximum bending moment, in ft. tons, on a beam supported at both ends and having an uniformly distributed load, W , is $\frac{W.L.}{8}$.

$$\text{Therefore the equivalent distributed load } W_E \left. \vphantom{\begin{matrix} \\ \end{matrix}} \right\} = \frac{\text{Maximum bending moment in ft. tons} \times 8}{L}$$

$$\text{Hence } W_E \text{ in this case} = \frac{50 \times 8}{16} = 25 \text{ tons.}$$

Reference to the table of safe distributed loads on beams will shew that B.S.B 26 (15" x 6" x 59 lbs.) is capable of carrying 26 tons at 16 feet span; and, as half the maximum load given in the table for this beam ($\frac{62}{2} = 31$ tons) is greater than the maximum reaction R_2 (10 tons), this beam will meet the requirements.

MENSURATION.**LENGTH.**

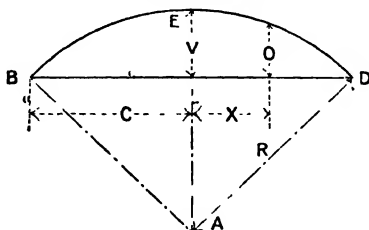
Circumference of Circle = diameter $\times \pi$

Diameter of Circle = circumference $\times \cdot 31831$

Length of Arc = number of degrees \times radius $\times \cdot 017453$

Degrees in an Arc whose length = radius = $57^\circ \cdot 2957795$

$$\pi = 3 \cdot 14159265 +$$



V = versed sine

C = half the chord.

R = radius

O = any ordinate.

X = distance of ordinate from centre.

$$O = \sqrt{R^2 - X^2} - (R - V).$$

$$R = \frac{V^2 + C^2}{2V} \text{ or diameter} = \frac{V^2 + C^2}{V}$$

$$V = R - \sqrt{R^2 - C^2}$$

$$X = \sqrt{R^2 - (O + R - V)^2}$$

AREA.

Area of Triangle = base \times half the perpendicular height.

$$\text{Area of Circle} = \frac{\pi D^2}{4} = \pi R^2 \text{ where } D = \text{diameter of circle.}$$

R = radius of circle.

Area of Sector

of Circle = Area ABED = length of arc \times half the radius

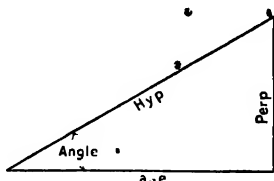
$$= \frac{\text{number of degrees in arc} \times \text{area of circle}}{360}$$

Area of Segment of Circle = Area BDE = area of Sector less area of triangle.

Area of Parabola = base $\times \frac{2}{3}$ height.

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TRIGONOMETRICAL 'FUNCTIONS'.

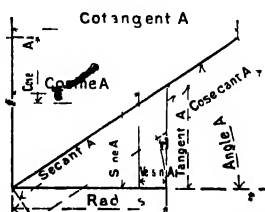


Sine	Perp Hyp	Cosine	Base Hyp	Tangent	Perp Base
Cotangent	Base Perp	Secant	Hyp Base		
Cosecant	Hyp Perp	Versed sine	Hyp - Base Hyp		

2 Covered since Hyp Perp
Hyp

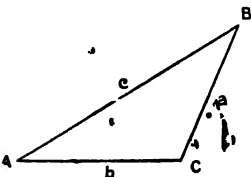
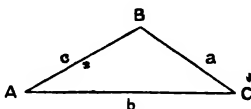
$$\begin{aligned} \sin \theta &= \frac{\text{opp}}{\text{hyp}} = \frac{1}{\sec \theta} = \cos \theta \\ \cos \theta &= \frac{\text{adj}}{\text{hyp}} = \frac{1}{\sec \theta} = \sin \theta \end{aligned}$$
$$\begin{array}{ccccccc} \text{cosec} & \sec & \tan & & & & \\ \sin & \cos & \sin & \sec & \csc & 1 & \\ \cos & \csc & \sec & \sin & \cos & & \\ \tan & \sqrt{\csc} & 1 & \cos & \sin & & \\ \csc & \sqrt{1 + \tan} & \tan & \sin & & & \end{array}$$
$$\cos \theta = \frac{1}{\sin \theta} \sqrt{1 - \sin^2 \theta} \quad (\cos^2 \theta + \sin^2 \theta = 1)$$

Verism	$1 - \cos$	$1 + t \ln$	sec =
Compton	$1 - \sin$	$1 + \cot$	sec =

$$\frac{1}{\sin \theta} = \csc \theta$$


This diagram shows the different trigonometrical functions in terms of the angle A to the radius of 1

SOLUTION OF TRIANGLES.



$$a + b + c = 2s \qquad a = b \cos C + c \cos B$$

$$\begin{array}{ccccccc} & & b & & c & & 1b \\ \bullet & & \bullet & & \bullet & & \bullet \\ \text{sm A} & \text{sm B} & \text{sm C} & 2s & & & \end{array}$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc} \quad \text{or} \quad a^2 = b^2 + c^2 - 2bc \cos A$$

$$\sin \frac{A}{2} = \frac{\sqrt{s(s-b)(s-c)}}{bc} \quad \cos \frac{A}{2} = \frac{\sqrt{s(s-a)}}{b+c}$$

$$A^* / (s-b)(s-c)$$

$$2 \sqrt{s(s-1)}$$

$$\sin A = \frac{1}{\kappa} \sqrt{s(s-a)(s-b)(s-c)} \quad \text{where } s = \frac{a+b+c}{2}$$

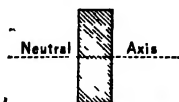
$$\tan \frac{B+C}{2} = \frac{b+c}{b-c} \cot \frac{A}{2}$$

$$\tan \frac{B-C}{2} = \frac{b-c}{b+c} \cot \frac{A}{2}$$

$$\text{Area of triangle} \left\{ \begin{aligned} &= \frac{a b \sin C}{2} = \frac{b c \sin A}{2} = \frac{a c \sin B}{2} = \end{aligned} \right.$$

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MOMENTS OF INERTIA OF RECTANGLES.



Depth in Inches	WIDTH OF RECTANGLE IN INCHES						
	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{5}{8}$
1	.021	.026	.031	.036	.042	.047	.052
2	.17	.21	.25	.29	.33	.38	.42
3	.56	.70	.84	.98	1.13	1.27	1.41
4	1.33	1.67	2.0	2.33	2.67	3.0	3.33
5	2.60	3.26	3.91	4.56	5.21	5.86	6.51
6	4.50	5.63	6.75	7.88	9.0	10.13	11.25
7	7.15	8.93	10.72	12.51	14.29	16.08	17.86
8	10.67	13.33	16.0	18.67	21.33	24.0	26.67
9	15.19	18.98	22.78	26.58	30.38	34.17	37.97
10	20.83	26.04	31.25	36.46	41.67	46.87	52.08
11	27.73	34.66	41.59	48.53	55.46	62.39	69.32
12	36.0	45.0	54.0	63.0	72.0	81.0	90.0
13	45.77	57.21	68.66	80.10	91.54	102.98	114.43
14	57.17	71.46	85.75	100.04	114.33	128.63	142.92
15	70.31	87.89	105.47	123.05	140.63	158.20	175.78
16	85.33	106.67	128.0	149.33	170.67	192.0	213.33
17	102.35	127.94	153.53	179.12	204.71	230.51	255.89
18	121.50	151.88	182.25	212.63	243.0	273.38	303.75
19	142.90	177.62	214.34	250.07	283.79	321.52	357.24
20	166.67	208.33	250.0	291.67	333.33	375.0	416.67
21	192.94	241.17	289.41	337.64	383.88	434.11	482.34
22	221.83	277.29	332.75	388.21	443.67	499.13	554.58
23	253.48	316.85	380.22	443.59	506.96	570.33	633.70
24	288.0	360.0	432.0	504.0	576.0	648.0	720.0
25	325.52	406.90	488.28	569.66	651.04	732.42	813.80
26	366.17	457.71	549.25	640.79	733.33	823.88	915.42
27	410.06	512.58	615.09	717.61	820.13	922.64	1025.16
28	457.33	571.67	686.0	800.33	914.67	1029.0	1143.33
29	508.10	635.13	762.16	889.18	1016.21	1143.23	1270.26
30	562.50	703.13	843.75	984.38	1125.0	1265.63	1406.25
32	682.67	853.33	1024.0	1194.67	1365.33	1536.0	1706.67
34	818.83	1023.54	1228.25	1432.96	1637.67	1842.38	2047.08
36	972.0	1215.0	1458.0	1701.0	1944.0	2187.0	2430.0
38	1143.17	1428.96	1714.75	2000.54	2286.33	2572.13	2857.92
40	1333.33	1666.67	2000.0	2333.33	2666.67	3000.0	3333.33
42	1543.50	1929.38	2315.25	2701.13	3087.0	3472.88	3858.75
44	1774.57	2218.33	2662.0	3105.67	3549.33	3993.0	4436.67
46	2027.83	2534.79	3041.75	3548.71	4055.67	4562.63	5069.58
48	2304.0	2880.0	3456.0	4032.0	4608.0	5184.0	5760.0
50	2604.17	3255.21	3906.25	4557.29	5208.13	5859.38	6510.42
52	2929.33	3661.67	4394.0	5126.33	5858.67	6591.0	7323.33
54	3280.50	4100.63	4920.75	5740.88	656.0	7381.13	8201.25
56	3658.67	4573.33	5488.0	6402.67	7317.33	8232.0	9146.67
58	4064.83	5081.04	6097.25	7113.46	8129.67	9145.87	10162.08
60	4500.0	5625.0	6750.0	7875.0	9040.0	10125.0	11250.0

DORMAN, LONG & CO. LIMITED.

MOMENTS OF INERTIA OF RECTANGLES.



WIDTH OF RECTANGLE IN INCHES						Depth in Inches
$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	1	
0.057	0.062	0.068	0.073	0.078	0.083	1
0.46	0.50	0.54	0.58	0.63	0.67	2
1.55	1.69	1.83	1.97	2.11	2.25	3
3.67	4	4.33	4.67	5	5.33	4
7.16	7.81	8.46	9.11	9.77	10.42	5
12.58	13.50	14.63	15.75	16.88	18	6
18.65	21.44	23.22	25.01	26.80	28.58	7
29.33	32	34.67	37.33	40	42.67	8
41.77	45.56	49.36	53.16	56.95	60.75	9
57.29	62.50	67.71	72.92	78.13	83.33	10
76.26	83.19	90.12	97.05	103.98	110.92	11
99	108	117	126	135	144	12
125.87	137.31	148.75	160.20	171.64	183.08	13
157.21	171.50	185.79	200.08	214.38	228.67	14
193.36	210.94	228.52	246.09	263.67	281.25	15
234.67	256	277.33	298.67	320	341.33	16
281.47	307.06	332.65	358.24	383.83	409.42	17
334.13	364.50	394.88	425.25	455.63	486	18
392.96	428.69	464.41	500.14	535.86	571.58	19
458.33	500	541.67	583.33	625	666.67	20
530.58	578.81	627.05	675.28	723.52	771.75	21
610.04	665.50	720.96	776.42	831.87	887.33	22
697.07	760.44	823.81	887.18	950.55	1013.92	23
792	864	936	1008	1080	1152	24
895.18	976.56	1057.94	1139.32	1220.70	1302.08	25
1006.96	1098.50	1190.04	1281.58	1373.13	1464.67	26
1127.67	1230.19	1332.70	1435.22	1537.73	1640.25	27
1257.67	1372	1486.33	1600.67	1715	1829.33	28
1397.29	1524.31	1651.54	1778.36	1905.39	2032.42	29
1546.88	1687.50	1828.13	1968.75	2109.38	2250	30
1877.33	2048	2218.67	2389.33	2560	2730.67	32
2251.79	2456.50	2661.21	2865.92	3070.63	3275.33	34
2673	2916	3155	3402	3645	3888	36
3143.71	3429.50	3715.29	4001.08	4286.88	4572.67	38
3666.67	4000	4433.33	4666.67	5000	5333.33	40
4244.63	4630.50	5016.38	5402.25	5788.13	6174	42
4880.33	5324	5767.67	6211.33	6655	7033.67	44
5576.54	6083.50	6590.46	7037.42	7604.38	8111.33	46
6336	6912	7488	8064	8640	9216	48
7161.46	7812.50	8463.54	9114.58	9765.63	10416.67	50
8055.67	8788	9520.33	10252.67	10985	11717.33	52
9021.38	9841.50	10661.63	11481.75	12301.88	13122	54
10061.33	10976	11890.67	12805.33	13720	14634.67	56
11178.29	12194.50	13210.71	14226.92	15243.12	16259.33	58
12375	13500	14625	15750	16875	18000	60

DORMAN, LONG & CO. LIMITED.

MOMENTS OF INERTIA OF RECTANGLES.

Neutral



Axis

Depths in Inches	Widths in Inches, corresponding to those of Flats, see page 30.									
	8	9	10	12	13	14	16	18	20	24
$\frac{3}{8}$..	·035	·040	·044	·053	·057	·062	·070	·079	·088	·105
$\frac{1}{2}$..	·066	·063	·070	·084	·091	·098	·112	·126	·140	·167
$\frac{5}{8}$..	·083	·094	·104	·125	·135	·146	·167	·187	·208	·250
$\frac{7}{8}$..	·119	·133	·148	·178	·193	·208	·237	·267	·297	·356
1 ..	·165	·183	·203	·244	·264	·285	·326	·366	·406	·488
$1\frac{1}{8}$..	·217	·244	·271	·325	·352	·379	·433	·487	·542	·650
$1\frac{1}{4}$..	·281	·316	·352	·422	·457	·492	·562	·633	·703	·844
$1\frac{1}{2}$..	·358	·402	·447	·536	·581	·626	·715	·805	·894	·1·073
$1\frac{3}{4}$..	·447	·502	·558	·670	·726	·782	·893	·1·005	·1·117	·1·340
2 ..	·549	·618	·687	·824	·893	·961	·1·099	·1·236	·1·373	·1·648
$2\frac{1}{8}$..	·667	·750	·833	1·000	1·085	1·177	1·333	1·500	1·667	2·000
$2\frac{1}{4}$..	·800	·906	1·000	1·199	1·290	1·389	1·599	1·799	1·999	2·399
$2\frac{1}{2}$..	·949	1·068	1·187	1·424	1·542	1·661	1·898	2·136	2·373	2·848
$2\frac{3}{4}$..	1·116	1·256	1·395	1·670	1·814	1·954	2·233	2·512	2·791	3·349
3 ..	1·302	1·465	1·628	1·953	2·116	2·279	2·604	2·930	3·255	3·906
$3\frac{1}{8}$..	1·507	1·696	1·884	2·261	2·449	2·638	3·015	3·391	3·768	4·522
$3\frac{1}{4}$..	1·733	1·950	2·166	2·600	2·816	3·033	3·466	3·899	4·333	5·199
$3\frac{1}{2}$..	1·980	2·228	2·475	2·970	3·218	3·466	3·961	4·456	4·951	5·941
$3\frac{3}{4}$..	2·250	2·531	2·812	3·375	3·636	3·897	4·500	5·062	5·625	6·750
4 ..	2·543	2·861	3·179	3·815	4·133	4·450	5·086	5·722	6·358	7·629
$4\frac{1}{8}$..	2·861	3·218	3·576	4·291	4·649	5·006	5·721	6·437	7·152	8·582
$4\frac{1}{4}$..	3·204	3·604	4·005	4·805	5·206	5·606	6·407	7·208	8·009	9·611
$4\frac{1}{2}$..	3·573	4·020	4·466	5·359	5·806	6·253	7·146	8·039	8·932	10·719
$4\frac{3}{4}$..	3·970	4·466	4·962	5·954	6·451	6·947	7·939	8·932	9·924	11·909
5 ..	4·396	4·944	5·493	6·592	7·141	7·690	8·789	9·888	10·986	13·184
$5\frac{1}{8}$..	4·849	5·455	6·061	7·273	7·879	8·485	9·698	10·910	12·122	14·546
$5\frac{1}{4}$..	5·333	6·000	6·667	8·000	8·667	9·333	10·667	12·000	13·333	16·000
$5\frac{1}{2}$..	5·849	6·580	7·311	8·774	9·505	10·236	11·698	13·161	14·623	17·547
$5\frac{3}{4}$..	6·397	7·197	7·996	9·586	10·395	11·195	12·794	14·394	15·993	19·191
6 ..	6·978	7·851	8·723	10·468	11·340	12·212	13·957	15·701	17·446	20·935
$6\frac{1}{8}$..	7·594	8·543	9·492	11·391	12·340	13·289	15·187	17·086	18·984	22·781
$6\frac{1}{4}$..	8·244	9·275	10·305	12·366	13·397	14·428	16·489	18·550	20·611	24·733
$6\frac{1}{2}$..	8·931	10·047	11·164	13·396	14·513	15·629	17·862	20·095	22·327	26·793
$6\frac{3}{4}$..	9·655	10·862	12·068	14·482	15·689	16·896	19·310	21·723	24·137	28·964
7 ..	10·417	11·719	13·021	15·625	16·927	18·229	20·833	23·437	26·042	31·250
$7\frac{1}{8}$..	11·218	12·620	14·022	16·826	18·229	19·631	22·435	25·240	28·044	33·653
$7\frac{1}{4}$..	12·059	13·566	15·073	18·088	19·595	21·103	24·117	27·132	30·146	36·176
$7\frac{1}{2}$..	12·941	14·558	16·176	19·411	21·028	22·646	26·881	29·116	32·351	38·822
$7\frac{3}{4}$..	13·865	15·598	17·331	20·797	22·530	24·263	29·729	31·195	34·661	41·594
8 ..	14·832	16·685	18·539	22·247	24·101	25·955	31·613	33·371	37·079	44·495
$8\frac{1}{8}$..	15·842	17·823	19·803	23·764	25·744	27·724	33·685	35·646	39·606	47·527
$8\frac{1}{4}$..	16·898	19·011	21·123	25·347	27·460	29·572	35·797	38·021	42·246	50·685
$8\frac{1}{2}$..	18·000	20·250	22·500	27·000	29·250	31·500	36·000	40·500	45·000	54·000

DORMAN, LONG & CO. LIMITED.

SHEARING AND BEARING VALUES OF RIVETS.

Dia of Rivet in inches	Area in Square inches	Shearing Values at 4 tons per sq inch		BEARING VALUES AT 7 TONS PER SQ INCH											
		Single Shear	Double Shear	Thickness in inches of Plate passed through											
				1/4	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
3/8	1104	44	77	66	82										
1/2	1963	74	137	87	1 09	1 31	1 53								
5/8	3068	1 23	2 15	1 09	1 37	1 64	1 91	2 19							
1	4418	1 77	3 03	1 31	1 64	1 97	2 30	2 62	2 95	3 28					
1 1/8	6013	2 41	4 21	1 53	1 91	2 30	2 68	3 06	3 45	3 83	4 21				
1 1/4	7854	3 14	5 50	1 75	2 19	2 62	3 06	3 50	3 94	4 37	4 81	5 25	6 12		

Dia of Rivet in inches	Area in Square inches	Shearing Values at 5 tons per sq inch		BEARING VALUES AT 8 TONS PER SQ INCH											
		Single Shear	Double Shear	Thickness in inches of Plate passed through											
				1/4	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
3/8	1104	55	97	82	1 03										
1/2	1963	98	1 72	1 09	1 37	1 64	1 91								
5/8	3068	1 53	2 68	1 37	1 71	2 05	2 39	2 73							
1	4418	2 21	3 87	1 64	2 03	2 46	2 87	3 28	3 69	4 10					
1 1/8	6013	3 01	5 26	1 91	2 33	2 87	3 35	3 83	4 31	4 79	5 26				
1 1/4	7854	3 83	6 87	2 19	2 73	3 28	3 83	4 37	4 92	5 47	6 02	6 56	7 66		

Dia of Rivet in inches	Area in Square inches	Shearing Values at 6 tons per sq inch		BEARING VALUES AT 10 TONS PER SQ INCH											
		Single Shear	Double Shear	Thickness in inches of Plate passed through											
				1/4	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
3/8	1104	66	1 16	98	1 23										
1/2	1963	1 18	2 06	1 31	1 64	1 97	2 30								
5/8	3068	1 84	3 22	1 64	2 05	2 46	2 87	3 28							
1	4418	2 65	4 64	1 97	2 46	2 95	3 45	3 94	4 43	4 92					
1 1/8	6013	3 61	6 31	2 30	2 87	3 45	4 02	4 59	5 17	5 74	6 32				
1 1/4	7854	4 71	8 25	2 62	3 28	3 94	4 59	5 25	5 91	6 56	7 22	7 87	9 19		

In the above tables double shear is calculated at $1\frac{1}{2}$ times single shear, and the bearing stress per square inch at $1\frac{1}{2}$ times the shearing stress.

The bearing values above and to the right of the upper zigzag lines in the tables are greater than double shear for the corresponding diameters, so that in these cases the shearing values are the determining factors.

The bearing values between the lower and upper zigzag lines are greater than single and less than double shear for the corresponding diameters, so that in case of single shear the shearing value is the determining factor, and in case of double shear the bearing value is the determining factor.

The bearing values below and to the left of the lower zigzag lines are less than single shear, so that in these cases the bearing values are the determining factors.

DORMAN, LONG & CO. LIMITED.

WEIGHTS OF ANGLES IN LBS. PER
LINEAL FOOT.

SUM OF FLANGES IN INCHES									Thickness of Angle in inches
8	8½	9	9½	10	10½	11	12	16	
..	..	..	..	..	..	..	..	..	⅜
..	..	..	..	..	..	..	..	..	¼
8.17	..	..	..	..	..	..	..	..	⅝
9.72	10.37	11.00	11.64	12.27	..	..	..	..	¾
11.95	12.01	12.74	13.49	14.23	14.97	15.70	17.21	..	⅞
12.75	13.61	14.46	15.31	16.15	17.00	17.84	19.56	26.35	1½
14.22	15.19	16.14	17.10	18.05	19.01	19.95	21.89	29.52	1⅝
15.67	16.74	17.80	18.87	19.92	20.98	22.04	24.18	32.67	1¾
17.09	18.27	19.44	20.61	21.77	22.94	24.10	26.45	35.79	1⅞
18.49	19.77	21.04	22.32	23.59	24.86	26.13	28.70	38.89	2¼
..	..	24.18	25.67	27.15	28.63	30.11	33.11	45.00	2⅝
..	..	..	..	30.60	32.30	33.99	37.41	51.00	1

AREAS OF ANGLES IN SQUARE INCHES.

SUM OF FLANGES IN INCHES									Thickness of Angle in inches
7½	8	8½	9	9½	10	10½	11	12	16
..	..	..	..	..	..	..	..	..	⅜
..	..	..	..	..	..	..	..	..	¼
2.246	2.402	..	..	..	..	..	..	..	⅝
2.671	2.859	3.050	3.236	3.424	3.610	..	..	..	¾
3.089	3.308	3.531	3.748	3.967	4.184	4.403	4.619	5.062	⅞
3.499	3.749	4.003	4.252	4.502	4.750	5.000	5.248	5.753	1½
3.902	4.183	4.468	4.748	5.029	5.309	5.590	5.869	6.437	1⅝
4.296	4.609	4.925	5.236	5.549	5.860	6.172	6.482	7.112	1¾
4.683	5.027	5.375	5.717	6.061	6.403	6.746	7.088	7.780	1⅞
..	5.437	5.816	6.196	6.564	6.938	7.313	7.686	8.441	2¼
..	..	..	7.111	7.549	7.985	8.422	8.857	9.737	2⅝
..	..	..	..	..	9.000	9.500	9.998	11.003	1

DORMA, LONG & CO. LIMITED.

WEIGHT OF FLAT ROLLED STEEL IN LBS. PER LINEAL FOOT.

Width in Inches		THICKNESS IN INCHES							
		1/8	1/4	3/8	1/2	5/8	3/4	7/8	1
1 1/2	1	.213	.425	.638	.850	1.06	1.28	1.49	1.70
	1 1/4	.286	.531	.797	1.06	1.33	1.59	1.86	2.13
2 1/2	1 1/2	.319	.638	.956	1.28	1.59	1.91	2.23	2.55
	1 3/4	.372	.744	1.12	1.49	1.86	2.23	2.60	2.98
3 1/2	2	.425	.850	1.28	1.70	2.13	2.55	2.98	3.40
	2 1/4	.478	.956	1.43	1.91	2.39	2.87	3.38	3.83
4 1/2	2 1/2	.531	1.06	1.59	2.13	2.66	3.19	3.72	4.25
	2 3/4	.584	1.17	1.75	2.34	2.92	3.51	4.09	4.68
5 1/2	3	.638	1.28	1.91	2.55	3.19	3.83	4.46	5.10
	3 1/4	.691	1.38	2.07	2.76	3.45	4.1	4.83	5.53
6 1/2	3 1/2	.744	1.49	2.23	2.98	3.72	4.46	5.21	5.95
	3 3/4	.797	1.59	2.39	3.19	3.98	4.78	5.58	6.38
7 1/2	4	.850	1.70	2.55	3.40	4.25	5.10	5.95	6.80
	4 1/4	.903	1.81	2.71	3.61	4.52	5.42	6.32	7.23
8 1/2	4 1/2	.956	1.91	2.87	3.83	4.78	5.74	6.69	7.65
	4 3/4	1.01	2.02	3.03	4.04	5.05	6.06	7.07	8.08
9 1/2	5	1.06	2.13	3.19	4.25	5.31	6.38	7.44	8.50
	5 1/4	1.12	2.23	3.35	4.46	5.58	6.39	7.81	8.93
10 1/2	5 1/2	1.17	2.34	3.51	4.68	5.91	7.01	8.18	9.35
	5 3/4	1.22	2.44	3.67	4.89	6.11	7.33	8.55	9.78
11 1/2	6	1.28	2.55	3.83	5.10	6.36	7.65	8.93	10.20
	6 1/4	1.33	2.66	3.98	5.31	6.64	7.97	9.30	10.63
12 1/2	6 1/2	1.38	2.76	4.14	5.53	6.91	8.29	9.67	11.05
	6 3/4	1.43	2.87	4.30	5.74	7.17	8.61	10.04	11.48
13 1/2	7	1.48	2.98	4.46	5.95	7.44	8.93	10.41	11.90
	7 1/4	1.54	3.08	4.62	6.16	7.70	9.24	10.78	12.33
14 1/2	7 1/2	1.59	3.19	4.78	6.38	7.97	9.56	11.16	12.75
	7 3/4	1.65	3.29	4.94	6.59	8.23	9.88	11.53	13.18
15 1/2	8	1.70	3.40	5.10	6.80	8.50	10.20	11.90	13.60
	8 1/4	1.75	3.51	5.26	7.01	8.77	10.52	12.27	14.03
16 1/2	8 1/2	1.81	3.61	5.42	7.23	9.03	10.84	12.64	14.45
	8 3/4	1.86	3.72	5.58	7.44	9.30	11.16	13.02	14.88
17 1/2	9	1.91	3.83	5.74	7.65	9.56	11.48	13.39	15.30
	9 1/4	1.97	3.93	5.90	7.86	9.83	11.80	13.76	15.76
18 1/2	9 1/2	2.02	4.04	6.06	8.08	10.09	12.11	14.13	16.15
	9 3/4	2.07	4.14	6.22	8.29	10.36	12.43	14.50	16.58
19 1/2	10	2.13	4.25	6.38	8.50	10.63	12.75	14.88	17.00
	10 1/4	2.18	4.36	6.53	8.71	10.89	13.07	15.25	17.43
20 1/2	10 1/2	2.23	4.46	6.70	8.93	11.16	13.39	15.62	17.85
	10 3/4	2.28	4.57	6.85	9.14	11.42	13.71	15.99	18.28
21 1/2	11	2.34	4.68	7.01	9.35	11.69	14.03	16.36	18.70
	11 1/4	2.39	4.78	7.17	9.56	11.95	14.34	16.73	19.13
22 1/2	11 1/2	2.44	4.89	7.33	9.78	12.21	14.66	17.11	19.55
	11 3/4	2.50	5.00	7.49	9.99	12.43	14.98	17.48	19.98
23 1/2	12	2.55	5.10	7.65	10.20	12.75	15.30	17.85	20.40

DORMAN, LONG & CO. LIMITED.

WEIGHT OF FLAT ROLLED STEEL IN LBS.
PER LINEAL FOOT.

THICKNESS IN INCHES								Width in Inches
$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	
1.91	2.13	2.34	2.55	2.76	2.98	3.19	3.40	1
2.39	2.66	2.92	3.19	3.45	3.72	3.98	4.25	1 1/4
2.87	3.19	3.51	3.83	4.14	4.46	4.78	5.10	1 1/2
3.35	3.72	4.09	4.46	4.83	5.21	5.58	5.95	1 3/4
3.83	4.25	4.68	5.10	5.53	5.95	6.38	6.80	2
4.30	4.78	5.26	5.74	6.22	6.69	7.17	7.65	2 1/4
4.77	5.31	5.84	6.38	6.91	7.44	7.97	8.50	2 1/2
5.25	5.84	6.43	7.01	7.60	8.18	8.77	9.35	2 3/4
5.74	6.38	7.01	7.65	8.29	8.93	9.56	10.20	3
6.22	6.91	7.60	8.29	8.98	9.67	10.36	11.05	3 1/4
6.70	7.44	8.18	8.93	9.67	10.41	11.16	11.90	3 1/2
7.17	7.97	8.77	9.56	10.36	11.16	11.95	12.75	3 3/4
7.65	8.50	9.35	10.20	11.05	11.90	12.75	13.60	4
8.13	9.03	9.93	10.84	11.74	12.64	13.55	14.45	4 1/4
8.61	9.56	10.52	11.48	12.43	13.39	14.34	15.30	4 1/2
9.08	10.09	11.10	12.11	13.12	14.13	15.14	16.15	4 3/4
9.56	10.63	11.69	12.75	13.81	14.88	15.94	17.00	5
10.04	11.16	12.27	13.39	14.50	15.62	16.73	17.85	5 1/4
10.52	11.69	12.86	14.03	15.19	16.36	17.53	18.70	5 1/2
11.00	12.22	13.44	14.66	15.88	17.11	18.33	19.55	5 3/4
11.48	12.75	14.03	15.30	16.58	17.85	19.13	20.40	6
11.95	13.28	14.61	15.94	17.27	18.59	19.92	21.25	6 1/4
12.43	13.81	15.19	16.58	17.96	19.34	20.72	22.10	6 1/2
12.91	14.34	15.78	17.21	18.65	20.08	21.52	22.95	6 3/4
13.39	14.88	16.36	17.85	19.34	20.83	22.31	23.80	7
13.87	15.41	16.95	18.49	20.03	21.57	23.11	24.65	7 1/4
14.34	15.94	17.53	19.13	20.72	22.31	23.91	25.50	7 1/2
14.82	16.47	18.12	19.76	21.41	23.06	24.70	26.35	7 3/4
15.30	17.00	18.70	20.40	22.10	23.80	25.50	27.20	8
15.78	17.53	19.28	21.04	22.79	24.54	26.30	28.05	8 1/4
16.26	18.06	19.87	21.68	23.48	25.29	27.10	28.90	8 1/2
16.73	18.59	20.45	22.31	24.17	26.03	27.89	29.75	8 3/4
17.21	19.13	21.04	22.95	24.86	26.78	28.69	30.60	9
17.69	19.66	21.62	23.59	25.55	27.52	29.48	31.45	9 1/4
18.17	20.19	22.21	24.23	26.24	28.26	30.28	32.30	9 1/2
18.65	20.72	22.79	24.86	26.93	29.01	31.08	33.15	9 3/4
19.13	21.25	23.38	25.50	27.63	29.75	31.88	34.00	10
19.60	21.78	23.96	26.14	28.32	30.49	32.67	34.85	10 1/4
20.08	22.31	24.54	26.78	29.01	31.24	33.47	35.70	10 1/2
20.56	22.84	25.13	27.41	29.70	31.98	34.27	36.55	10 3/4
21.04	23.38	25.71	28.05	30.39	32.73	35.06	37.40	11
21.52	23.91	26.30	28.69	31.08	33.47	35.86	38.25	11 1/4
22.00	24.44	26.88	29.33	31.77	34.21	36.66	39.10	11 1/2
22.47	24.97	27.47	29.96	32.46	34.96	37.45	39.95	11 3/4
22.95	25.50	28.05	30.60	33.15	35.70	38.25	40.80	12

DORMAN, LONG & CO. LIMITED.

WEIGHT OF FLAT ROLLED STEEL IN LBS.
PER LINEAL FOOT.

Width in Inches	THICKNESS, IN INCHES							
	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
13	2.76	5.53	8.29	11.05	13.81	16.58	19.34	22.10
14	2.98	5.95	8.93	11.90	14.88	17.85	20.83	23.80
15	3.19	6.38	9.56	12.75	15.94	19.13	22.31	25.50
16	3.40	6.80	10.20	13.60	17.00	20.40	23.80	27.20
17	3.61	7.23	10.84	14.45	18.06	21.68	25.29	28.90
18	3.83	7.65	11.48	15.30	19.13	22.95	26.78	30.60
19	4.04	8.08	12.11	16.15	20.19	24.23	28.26	32.30
20	4.25	8.50	12.75	17.00	21.25	25.50	29.75	34.00
21	4.46	8.93	13.30	17.85	22.31	26.78	31.24	35.70
22	4.68	9.35	14.03	18.70	23.38	28.07	32.72	37.40
23	4.89	9.78	14.66	19.55	24.44	29.33	34.21	39.10
24	5.10	10.20	15.30	20.40	25.50	30.60	35.70	40.80
25	5.31	10.62	15.94	21.25	26.56	31.88	37.19	42.50
26	5.53	11.05	16.58	22.10	27.63	33.15	38.68	44.20
27	5.74	11.48	17.21	22.95	28.69	34.43	40.16	45.90
28	5.95	11.90	17.85	23.80	29.75	35.70	41.65	47.60
29	6.16	12.33	18.49	24.65	30.81	36.98	43.14	49.30
30	6.38	12.75	19.13	25.50	31.88	38.25	44.63	51.00
31	6.59	13.18	19.76	26.35	32.94	39.53	46.11	52.70
32	6.80	13.60	20.40	27.20	34.00	40.80	47.60	54.40
33	7.01	14.03	21.04	28.05	35.06	42.08	49.09	56.10
34	7.23	14.45	21.68	28.90	36.13	43.35	50.58	57.80
35	7.44	14.88	22.31	29.75	37.19	44.63	52.06	59.50
36	7.65	15.30	22.95	30.60	38.25	45.90	53.55	61.20
37	7.86	15.73	23.59	31.45	39.31	47.18	55.04	62.90
38	8.08	16.15	24.23	32.30	40.38	48.45	56.53	64.60
39	8.29	16.58	24.86	33.15	41.44	49.73	58.01	66.30
40	8.50	17.00	25.50	34.00	42.50	51.00	59.50	68.00
41	8.71	17.43	26.14	34.85	43.56	52.28	60.99	69.70
42	8.93	17.85	26.78	35.70	44.63	53.55	62.48	71.40
43	9.14	18.28	27.41	36.55	45.69	54.83	63.96	73.10
44	9.35	18.70	28.05	37.40	46.75	56.10	65.45	74.80
45	9.56	19.13	28.69	38.25	47.81	57.38	66.94	76.50
46	9.78	19.55	29.33	39.10	48.88	58.65	68.43	78.20
47	9.99	19.98	29.96	39.95	49.94	59.93	69.91	79.90
48	10.20	20.40	30.60	40.80	51.00	61.20	71.40	81.60
50	10.63	21.25	31.88	42.50	53.13	63.75	74.38	85.00
52	11.05	22.10	33.15	44.20	55.25	66.30	77.35	88.40
54	11.48	22.95	34.43	45.90	57.38	68.85	80.33	91.80

VALUES FOR ADDITIONAL WIDTHS OF $\frac{1}{4}$ " $\frac{1}{8}$ " AND $\frac{3}{8}$ ".

$\frac{1}{4}$	0.53	1.06	1.59	2.13	2.66	3.19	3.72	4.25
$\frac{1}{8}$	1.06	2.13	3.19	4.25	5.31	6.38	7.44	8.50
$\frac{3}{8}$	1.59	3.19	4.78	6.38	7.97	9.56	11.16	12.75

DORMAN, LONG & CO. LIMITED.

WEIGHT OF FLAT ROLLED STEEL IN LBS.
PER LINEAL FOOT.

THICKNESS, IN INCHES								Width in Inches
$\frac{9}{16}$	$\frac{7}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$	1	
24' 86	27' 63	30' 39	33' 15	35' 91	38' 68	41' 44	44' 20	13
26' 78	29' 75	32' 73	35' 70	38' 66	41' 65	44' 63	47' 60	14
28' 69	31' 88	35' 06	38' 25	41' 44	44' 63	47' 81	51' 00	15
30' 60	34' 00	37' 40	40' 80	44' 20	47' 60	51' 00	54' 40	16
32' 51	36' 13	39' 74	43' 35	46' 96	50' 58	54' 19	57' 80	17
34' 43	38' 25	42' 08	45' 90	49' 73	53' 55	57' 38	61' 20	18
36' 34	40' 38	44' 41	48' 45	52' 49	56' 53	60' 56	64' 60	19
38' 25	42' 50	46' 75	51' 00	55' 25	59' 50	63' 75	68' 00	20
40' 16	44' 63	49' 09	53' 55	58' 01	62' 48	66' 94	71' 40	21
42' 08	46' 75	51' 43	56' 10	60' 78	65' 45	70' 13	74' 80	22
43' 99	48' 88	53' 76	58' 65	63' 54	68' 43	73' 31	78' 20	23
45' 90	51' 00	56' 10	61' 20	66' 30	71' 40	76' 50	81' 60	24
47' 81	53' 13	58' 44	63' 75	69' 06	74' 38	79' 69	85' 00	25
49' 73	55' 25	60' 78	66' 30	71' 83	77' 35	82' 88	88' 40	26
51' 64	57' 38	63' 11	68' 85	74' 59	80' 33	86' 06	91' 80	27
53' 55	59' 50	65' 45	71' 40	77' 35	83' 30	89' 25	95' 20	28
55' 46	61' 63	67' 79	73' 95	80' 11	86' 28	92' 44	98' 60	29
57' 38	63' 75	70' 13	76' 50	82' 38	89' 25	95' 63	102' 00	30
59' 29	65' 88	72' 46	79' 05	85' 64	92' 23	98' 81	105' 40	31
61' 20	68' 00	74' 80	81' 60	88' 40	95' 20	102' 00	108' 80	32
63' 11	70' 13	77' 14	84' 15	91' 16	98' 18	105' 19	112' 20	33
65' 03	72' 25	79' 48	86' 70	93' 93	101' 15	108' 38	115' 60	34
66' 94	74' 38	81' 81	89' 25	96' 69	104' 13	111' 56	119' 00	35
68' 85	76' 50	84' 15	91' 80	99' 45	107' 10	114' 75	122' 40	36
70' 76	78' 63	86' 49	94' 35	102' 21	110' 08	117' 94	125' 80	37
72' 68	80' 75	88' 81	96' 90	104' 98	113' 05	121' 13	129' 20	38
74' 59	82' 88	91' 16	99' 45	107' 74	116' 03	124' 31	132' 60	39
76' 50	85' 00	93' 50	102' 00	110' 50	119' 00	127' 50	136' 00	40
78' 41	87' 13	95' 84	104' 55	113' 26	121' 98	130' 89	139' 40	41
80' 33	89' 25	98' 18	107' 10	116' 03	124' 95	133' 88	142' 80	42
82' 24	91' 38	100' 51	109' 65	118' 79	127' 93	137' 06	146' 20	43
84' 15	93' 50	102' 85	112' 20	121' 55	130' 90	140' 25	149' 60	44
86' 06	95' 63	105' 19	114' 75	124' 31	133' 88	143' 44	153' 00	45
87' 98	97' 75	107' 53	117' 30	127' 08	136' 35	146' 63	156' 40	46
89' 89	99' 88	109' 86	119' 85	129' 84	139' 83	149' 81	159' 80	47
91' 80	102' 00	112' 20	122' 40	132' 60	142' 20	153' 00	163' 20	48
95' 63	106' 25	116' 88	127' 50	138' 13	148' 75	159' 38	170' 00	50
99' 45	110' 50	121' 55	132' 60	143' 65	154' 70	165' 75	176' 80	52
103' 28	114' 75	126' 23	137' 70	149' 18	160' 65	172' 13	183' 60	54
VALUES FOR ADDITIONAL WIDTHS OF $\frac{1}{4}$ ", $\frac{1}{2}$ " AND $\frac{3}{4}$ ".								
478	531	584	638	691	744	797	850	... $\frac{1}{4}$
956	1063	1169	1275	1331	1488	1594	1700	... $\frac{1}{2}$
1434	1594	1753	1913	2072	2232	2391	2550	... $\frac{3}{4}$

DORMAN, LONG & CO. LIMITED.

WEIGHT OF ROUND AND SQUARE STEEL BARS
IN LBS. PER LINEAL FOOT.

Diameter or Side in inches	Round ●	Square ■	Diameter or Side in inches	Round ●	Square ■	Diameter or Side in inches	Round ●	Square ■
1/4	167	213	1 1/4	4 172	5 312	3	24 03	30 60
5/16	261	332	1 3/8	5 049	6 428	3 1/4	28 21	35 91
3/8	376	478	1 1/2	6 008	7 650	3 1/2	32 71	41 65
7/16	511	661	1 5/8	7 051	8 978	3 3/4	37 55	47 81
1/2	668	849	1 3/4	8 173	10 412	4	42 73	54 40
5/8	845	1 076	1 7/8	9 332	11 953	4 1/4	48 23	61 41
3/4	1 043	1 328	2	10 641	13 600	4 1/2	54 07	68 85
7/8	1 262	1 607	2 1/8	12 06	15 35	4 3/4	60 25	76 71
1	1 502	1 912	2 1/4	13 52	17 21	5	66 76	85 00
1 1/8	1 763	2 245	2 3/8	15 06	19 18	5 1/4	73 60	93 71
1 1/4	2 044	2 603	2 1/2	16 69	21 25	5 1/2	80 78	102 85
1 1/2	2 347	2 988	2 5/8	18 40	23 43	5 3/4	88 29	112 41
1 3/4	2 670	3 400	2 3/4	20 19	25 71	6	96 13	122 40
1 1/2	3 380	4 303	2 7/8	22 07	28 10			

WHITWORTH'S STANDARD SIZES OF BOLTS
AND NUTS.

Diameter of Bolt in inches		No. of Threads per inch	Diameter at bottom of Thread in inches	Distance over Flats in inches	Distance over Corners in inches	Thickness of Bolt Head in inches	Sectional Area at bottom of Thread in square inches
Fractional Size	Decimal Size						
1/4	25	20	186	525	606	219	027
3/8	375	16	295	709	819	328	063
1/2	5	12	393	919	1 061	437	121
5/8	625	11	508	1 101	1 271	547	203
3/4	75	10	622	1 301	1 502	656	304
7/8	875	9	733	1 479	1 707	766	422
1	1 0	8	840	1 670	1 928	875	554
1 1/8	1 25	7	942	1 860	2 148	984	697
1 1/4	1 25	7	1 067	2 048	2 365	1 094	894
1 3/8	1 375	6	1 161	2 215	2 557	1 203	1 060
1 1/2	1 5	6	1 286	2 413	2 787	1 312	1 300

DORMAN, LONG & CO. LIMITED.

CALCULATED WEIGHTS IN POUNDS OF
WHITWORTH'S STANDARD BOLTS & NUTS.

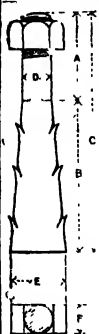
Hexagonal Head and Nut

Length A in inches	DIAMETER OF BOLT IN INCHES									
	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
1	042	106	222	376	612					
1 1/8	044	110	223	387	620					
1 1/4	045	114	236	400	645	944				
1 1/2	047	118	243	408	653	965				
1 3/4	049	122	250	413	675	986	1 394			
2	050	126	257	440	690	1 408	1 421			
2 1/8	052	130	264	441	706	1 029	1 449			
2 1/4	054	134	271	452	720	1 050	1 477	1 966		
2 1/2	056	138	276	460	731	1 072	1 505	2 006	2 671	
2 3/4	058	142	282	468	743	1 114	1 561	2 107	2 758	
3	063	153	300	503	800	1 157	1 616	2 177	2 845	3 572
3 1/8	065	161	313	518	821	1 199	1 671	2 247	2 932	3 673
3 1/4	066	163	315	521	826	1 242	1 727	2 318	3 019	3 793
3 1/2	071	177	347	571	881	1 284	1 782	2 389	3 106	3 888
3 3/4	075	180	360	595	906	1 327	1 838	2 459	3 193	3 983
4	077	182	371	610	926	1 369	1 893	2 529	3 280	4 088
4 1/8	082	200	400	637	951	1 412	1 948	2 600	3 367	4 204
4 1/4	085	209	405	645	961	1 454	2 005	2 670	3 454	4 309
4 1/2	088	216	417	660	977	1 497	2 062	2 740	3 541	4 414
4 3/4	092	221	421	670	991	1 540	2 116	2 810	3 628	4 517
5	096	232	441	704	1 035	1 583	2 172	2 881	3 714	4 624
5 1/8	099	240	448	714	1 044	1 626	2 228	2 951	3 801	4 730
5 1/4	100	247	457	727	1 057	1 667	2 283	3 021	3 888	4 836
5 1/2	106	250	460	737	1 070	1 710	2 339	3 092	3 974	4 940
5 3/4	110	260	471	751	1 083	1 753	2 394	3 163	4 061	5 046
6	117	271	481	767	1 100	1 800	2 450	3 234	4 152	5 151
6 1/8	124	284	500	791	1 127	1 853	2 506	3 304	4 243	5 256
6 1/4	130	290	510	804	1 140	1 900	2 561	3 374	4 334	5 361
6 1/2	137	296	521	818	1 154	1 943	2 617	3 444	4 425	5 466
7	141	301	531	831	1 167	1 986	2 672	3 514	4 516	5 571
7 1/8	147	310	541	845	1 181	2 029	2 728	3 584	4 607	5 676
7 1/4	150	316	551	856	1 194	2 072	2 783	3 654	4 698	5 781
7 1/2	157	326	561	869	1 208	2 115	2 838	3 724	4 789	5 886
8	161	341	581	890	1 221	2 158	2 893	3 794	4 880	5 991
8 1/8	167	357	601	911	1 235	2 201	2 948	3 864	4 971	6 096
8 1/4	170	361	611	921	1 248	2 244	2 999	3 934	5 062	6 201
8 1/2	173	365	621	931	1 261	2 287	3 050	4 004	5 153	6 306
9	177	371	631	941	1 274	2 330	3 105	4 074	5 244	6 411
9 1/8	180	376	641	951	1 287	2 373	3 160	4 144	5 335	6 516
9 1/4	183	381	651	961	1 299	2 416	3 215	4 214	5 426	6 621
9 1/2	186	386	661	971	1 312	2 459	3 269	4 284	5 517	6 726
10	190	391	671	981	1 325	2 502	3 324	4 354	5 608	6 831
10 1/8	193	396	681	991	1 338	2 545	3 379	4 424	5 699	6 936
10 1/4	196	401	691	1 001	1 351	2 588	3 434	4 494	5 790	7 041
10 1/2	199	406	701	1 011	1 364	2 631	3 489	4 564	5 881	7 146
11	203	411	711	1 021	1 377	2 674	3 544	4 634	5 972	7 251
11 1/8	206	416	721	1 031	1 390	2 717	3 599	4 704	6 063	7 356
11 1/4	209	421	731	1 041	1 403	2 760	3 654	4 774	6 154	7 461
11 1/2	212	426	741	1 051	1 416	2 803	3 709	4 844	6 245	7 566
12	216	431	751	1 061	1 429	2 846	3 764	4 914	6 336	7 671
Weight in lbs of one Nut	0154	0340	0526	0812	1198	1584	2070	2656	3242	3928
Weight in lbs of Shank per 1 inch of length	0139	0313	0497	0783	1169	1555	2041	2627	3213	3900
Weight in lbs of Shank per 1 foot of length	167	376	596	940	1403	1866	2449	3152	3856	4680

DORMAN, LONG & CO. LIMITED.

BOLTS, NUTS AND WASHERS.

APPROXIMATE WEIGHTS AND SIZES.



LEWIS BOLTS AND NUTS.

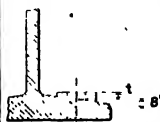
Dimensions in Inches and Weights in Lbs.

Dia- meter D	Concrete			York Stone			Granite		
	A	E	F	B	C	lbs. each	B	C	lbs. each
1/2	3 1/4	1 3/8	1 1/4	2 1/2	2 1/2	4 1/2	2 1/2	5 1/2	1 21
3/4	3 1/2	1 5/8	1 1/2	3 1/4	3 1/4	5 1/2	3 1/4	6 1/2	1 39
1	4 1/4	1 3/4	1 3/4	4 1/4	4 1/4	6 1/2	4 1/4	7 1/2	2 77
1 1/4	4 1/2	2 1/8	1 3/4	4 1/2	4 1/2	6 1/2	4 1/2	8 1/2	3 88
1 1/2	4 3/4	2 1/4	1 3/4	4 3/4	4 3/4	6 1/2	4 3/4	9 1/2	5 21
1 3/4	5 1/4	2 3/8	1 3/4	5 1/4	5 1/4	6 1/2	5 1/4	10 1/2	8 83

ORDINARY WASHERS.

Diameter of Bolt in inches	Outside Diameter of Washers in inches	Thick- ness in inches	Weight in lbs. per 100
1/2	1 1/4	1/4	2 1/2
3/4	1 5/8	1/4	4
1	1 3/4	1/4	5 1/2
1 1/4	2 1/4	1/4	7 1/2
1 1/2	2 3/4	1/4	14
1 3/4	2 3/4	1/4	17 1/2
1 3/8	2 5/8	1/4	21 1/2
1 1/2	2 7/8	1/4	26
1 3/4	3 1/8	1/4	30 1/2

BEVELLED WASHERS.



Diameter of Bolt in inches	Outside Diameter of Washers in inches	Thickness in inches	Weight in lbs. per 100
1/2	1 1/4	1/4	4
3/4	1 5/8	1/4	6
1	1 3/4	1/4	8
1 1/4	2 1/4	1/4	11
1 1/2	2 3/4	1/4	14

APPROXIMATE WEIGHTS AND SIZES OF GAS TUBING.

Nominal Bore in inches	3/4	1	1 1/4	1 1/2	1 3/4
External Diameter in inches	1 1/8	1 3/8	1 7/8	1 7/8	2 1/8
Weight in lbs. per lineal foot	1 176	1 680	2 464	3 136	3 463

DORMAN, LONG & CO. LIMITED.

APPROXIMATE WEIGHT IN LBS. OF 100
STEEL CUP-HEADED RIVETS.

Length A in inches		DIAMETER OF RIVET IN INCHES					
		$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
1	1 $\frac{1}{8}$	4.89	9.71	..	..	..	..
1 $\frac{1}{4}$	1 $\frac{1}{8}$	5.28	10.40	..	..	..	..
1 $\frac{1}{2}$	1 $\frac{1}{8}$	5.67	11.10	..	..	..	..
1 $\frac{3}{4}$	1 $\frac{1}{8}$	6.06	11.79	..	..	..	..
2	1 $\frac{1}{8}$	6.45	12.48	21.19	32.86	..	..
2 $\frac{1}{4}$	1 $\frac{1}{8}$	6.84	13.18	22.27	34.42	..	..
2 $\frac{1}{2}$	1 $\frac{1}{8}$	7.23	13.87	23.36	35.98	..	..
2 $\frac{3}{4}$	1 $\frac{1}{8}$	7.62	14.57	24.45	37.55	..	..
3	2	8.01	15.26	25.53	39.11	50.43	77.88
3 $\frac{1}{4}$	2	8.40	15.95	26.62	40.68	52.56	80.66
3 $\frac{1}{2}$	2	8.79	16.65	27.71	42.24	54.68	83.44
3 $\frac{3}{4}$	2	9.18	17.34	28.79	43.81	56.81	86.22
4	2	9.57	18.04	29.88	45.37	58.94	89.01
4 $\frac{1}{4}$	2	9.96	18.73	30.97	46.94	61.07	91.79
4 $\frac{1}{2}$	2	10.35	19.42	32.05	48.50	63.20	94.57
4 $\frac{3}{4}$	2	10.74	20.12	33.14	50.07	65.33	97.35
5	3	11.14	20.81	34.23	51.63	67.46	100.13
5 $\frac{1}{4}$	3	..	21.50	35.31	53.19	69.59	102.91
5 $\frac{1}{2}$	3	..	22.20	36.40	54.76	71.72	105.69
5 $\frac{3}{4}$	3	..	22.89	37.48	56.32	73.85	108.47
6	3	..	23.59	38.57	57.89	75.98	111.26
6 $\frac{1}{4}$	3	..	..	39.66	59.45	78.11	114.04
6 $\frac{1}{2}$	3	..	..	40.74	61.02	80.23	116.82
6 $\frac{3}{4}$	3	..	..	41.83	62.58	82.36	119.60
7	4	..	..	42.92	64.15	84.49	122.38
7 $\frac{1}{4}$	4	..	..	..	65.71	86.62	125.16
7 $\frac{1}{2}$	4	..	..	..	67.28	88.75	127.94
7 $\frac{3}{4}$	4	..	..	..	68.84	90.88	130.72
8	4	..	..	..	70.41	93.01	133.51
8 $\frac{1}{4}$	4	..	..	..	71.97	95.14	136.29
8 $\frac{1}{2}$	4	..	..	..	..	97.27	139.07
8 $\frac{3}{4}$	4	..	..	..	..	99.40	141.85
9	4	..	..	..	..	101.53	144.63
9 $\frac{1}{4}$	5	..	..	..	..	103.66	147.41
9 $\frac{1}{2}$	5	..	..	..	..	105.79	150.19
9 $\frac{3}{4}$	5	..	..	..	..	107.92	152.97
10	5	..	..	..	..	110.05	155.76
10 $\frac{1}{4}$	5	..	..	..	..	..	158.54
10 $\frac{1}{2}$	5	..	..	..	..	..	161.32
10 $\frac{3}{4}$	5	..	..	..	..	..	164.10
11	5	..	..	..	..	..	166.88
11 $\frac{1}{4}$	6	..	..	..	..	..	169.66
Approximate weight in lbs. of 100 Heads		1.76	4.16	8.15	14.08	22.36	33.38
Weight in lbs. per Rivet of 1 inch in length of shank		.0313	.0555	.0869	.1252	.1703	.2225

DORMAN, LONG & CO. LIMITED.

DECIMALS OF A FOOT FOR EACH
OF AN INCH.

Inch	0"	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
0	0	0833	1667	2500	3333	4167	5000	5833	6667	7500	8333	9167
$\frac{1}{16}$	0013	0846	1680	2513	3346	4180	5013	5846	6680	7513	8346	9180
$\frac{1}{8}$	0026	0859	1693	2526	3359	4193	5026	5859	6693	7526	8359	9193
$\frac{3}{16}$	0039	0872	1706	2539	3372	4206	5039	5872	6706	7539	8372	9206
$\frac{1}{4}$	0052	0885	1719	2552	3385	4219	5052	5885	6719	7552	8385	9219
$\frac{5}{16}$	0065	0898	1732	2565	3398	4232	5065	5898	6732	7565	8398	9232
$\frac{3}{8}$	0078	0911	1745	2578	3411	4245	5078	5911	6745	7578	8411	9245
$\frac{7}{16}$	0091	0924	1758	2591	3424	4258	5091	5924	6758	7591	8424	9258
$\frac{1}{2}$	0104	0937	1771	2604	3437	4271	5104	5937	6771	7604	8437	9271
$\frac{9}{16}$	0117	0950	1784	2617	3451	4284	5117	5950	6784	7617	8451	9284
$\frac{5}{8}$	0130	0964	1797	2630	3464	4297	5130	5964	6797	7630	8464	9297
$\frac{11}{16}$	0143	0977	1810	2643	3477	4310	5143	5977	6810	7643	8477	9310
$\frac{3}{4}$	0156	0990	1823	2656	3490	4323	5156	5990	6823	7656	8490	9323
$\frac{7}{8}$	0169	1003	1836	2669	3503	4336	5169	6003	6836	7669	8503	9336
$\frac{15}{16}$	0182	1016	1849	2682	3516	4349	5182	6016	6849	7682	8516	9349
1	0195	1029	1862	2695	3529	4362	5195	6029	6862	7695	8529	9362
$1 \frac{1}{16}$	0208	1042	1875	2708	3542	4375	5208	6042	6875	7708	8542	9375
$1 \frac{1}{8}$	0221	1055	1888	2721	3555	4388	5221	6055	6888	7721	8555	9388
$1 \frac{3}{16}$	0234	1068	1901	2734	3568	4401	5234	6068	6901	7734	8568	9401
$1 \frac{1}{4}$	0247	1081	1914	2747	3581	4414	5247	6081	6914	7747	8581	9414
$1 \frac{5}{16}$	0260	1094	1927	2760	3594	4427	5260	6094	6927	7760	8594	9427
$1 \frac{3}{8}$	0273	1107	1940	2773	3607	4440	5273	6107	6940	7773	8607	9440
$1 \frac{7}{16}$	0286	1120	1953	2786	3620	4453	5286	6120	6953	7786	8620	9453
$1 \frac{1}{2}$	0299	1133	1966	2799	3633	4466	5299	6133	6966	7799	8633	9466
$1 \frac{9}{16}$	0312	1146	1979	2812	3646	4479	5312	6146	6979	7812	8646	9479
$1 \frac{5}{8}$	0326	1159	1992	2826	3659	4492	5326	6159	6992	7826	8659	9492
$1 \frac{11}{16}$	0339	1172	2005	2839	3672	4505	5339	6172	7005	7839	8672	9505
$1 \frac{3}{4}$	0352	1185	2018	2852	3685	4518	5352	6185	7018	7852	8685	9518
$1 \frac{7}{8}$	0365	1198	2031	2865	3698	4531	5365	6198	7031	7865	8698	9531
2	0378	1211	2044	2878	3711	4544	5378	6211	7044	7878	8711	9544
$2 \frac{1}{16}$	0391	1224	2057	2891	3724	4557	5391	6224	7057	7891	8724	9557
$2 \frac{1}{8}$	0404	1237	2070	2904	3737	4570	5404	6237	7070	7904	8737	9570
$2 \frac{3}{16}$	0417	1250	2083	2917	3750	4583	5417	6250	7083	7917	8750	9583

DORMAN, LONG & CO. LIMITED.

DECIMALS OF A FOOT FOR EACH
OF AN INCH.

Inch	0"	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
$\frac{1}{16}$	0430	1263	2096	2930	3763	4596	5430	6263	7096	7930	8763	9596
$\frac{1}{8}$	0443	1276	2109	2943	3776	4609	5443	6276	7109	7943	8776	9609
$\frac{3}{16}$	0456	1289	2122	2956	3789	4622	5456	6289	7122	7956	8789	9622
$\frac{1}{4}$	0469	1302	2135	2969	3802	4635	5469	6302	7135	7969	8802	9635
$\frac{5}{16}$	0482	1315	2148	2982	3815	4648	5482	6315	7148	7982	8815	9648
$\frac{3}{8}$	0495	1328	2161	2995	3828	4661	5495	6328	7161	7995	8828	9661
$\frac{7}{16}$	0509	1341	2174	3008	3841	4674	5508	6341	7174	8008	8841	9674
$\frac{1}{2}$	0521	1354	2188	3021	3854	4688	5521	6354	7188	8021	8854	9688
$\frac{9}{16}$	0534	1367	2201	3034	3867	4701	5534	6367	7201	8034	8867	9701
$\frac{5}{8}$	0547	1380	2214	3047	3880	4714	5547	6380	7214	8047	8880	9714
$\frac{11}{16}$	0560	1393	2227	3060	3893	4727	5560	6393	7227	8060	8893	9727
$\frac{3}{4}$	0573	1406	2240	3073	3906	4740	5573	6406	7240	8073	8906	9740
$\frac{7}{8}$	0586	1419	2253	3086	3919	4753	5586	6419	7253	8086	8919	9753
$\frac{15}{16}$	0599	1432	2266	3099	3932	4766	5599	6432	7266	8099	8932	9766
$\frac{1}{1}$	0612	1445	2279	3112	3945	4779	5612	6445	7279	8112	8945	9779
$\frac{1}{1}$	0625	1458	2292	3125	3958	4792	5625	6458	7292	8125	8958	9792
$\frac{1}{1}$	0638	1471	2305	3138	3971	4805	5638	6471	7305	8138	8971	9805
$\frac{1}{1}$	0651	1484	2318	3151	3984	4818	5651	6484	7318	8151	8984	9818
$\frac{1}{1}$	0664	1497	2331	3164	3997	4831	5664	6497	7331	8164	8997	9831
$\frac{1}{1}$	0677	1510	2344	3177	4010	4844	5677	6510	7344	8177	9010	9844
$\frac{1}{1}$	0690	1523	2357	3190	4023	4857	5690	6523	7357	8190	9023	9857
$\frac{1}{1}$	0703	1536	2370	3203	4036	4870	5703	6536	7370	8203	9036	9870
$\frac{1}{1}$	0716	1549	2383	3216	4049	4883	5716	6549	7383	8216	9049	9883
$\frac{1}{1}$	0729	1562	2396	3229	4062	4896	5729	6562	7396	8229	9062	9896
$\frac{1}{1}$	0742	1576	2409	3242	4076	4909	5742	6576	7409	8242	9076	9909
$\frac{1}{1}$	0755	1589	2422	3255	4089	4922	5755	6589	7422	8255	9089	9922
$\frac{1}{1}$	0768	1602	2435	3268	4102	4935	5768	6602	7435	8268	9102	9935
$\frac{1}{1}$	0781	1615	2448	3281	4115	4948	5781	6615	7448	8281	9115	9948
$\frac{1}{1}$	0794	1628	2461	3294	4128	4961	5794	6628	7461	8294	9128	9961
$\frac{1}{1}$	0807	1641	2474	3307	4141	4974	5807	6641	7474	8307	9141	9974
$\frac{1}{1}$	0820	1654	2487	3320	4154	4987	5820	6654	7487	8320	9154	9987
$\frac{1}{1}$	0833	1667	2500	3333	4167	4999	5833	6667	7500	8333	9167	9999
$\frac{1}{1}$	0846	1680	2513	3346	4180	5012	5846	6680	7513	8346	9180	10000

DORMAN, LONG & CO. LIMITED.

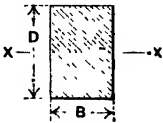
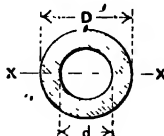
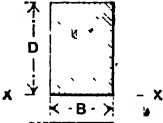
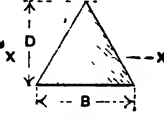
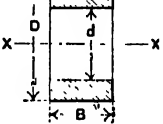
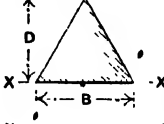


DECIMAL EQUIVALENTS.

EXACT DECIMAL EQUIVALENTS OF THE FRACTION OF AN INCH.

Fractions				Decimals	Fractions				Decimals
$\frac{1}{64}$	.	...	...	015625	$\frac{1}{64}$	.	...	...	515625
$\frac{1}{32}$	.	...	...	03125	$\frac{1}{32}$	.	...	...	53125
$\frac{1}{16}$	.	...	...	046875	$\frac{1}{16}$	.	...	...	546875
$\frac{1}{8}$	.	...	...	0625	$\frac{1}{8}$	.	...	...	5625
$\frac{5}{64}$	.	...	...	078125	$\frac{5}{64}$	.	...	...	578125
$\frac{3}{32}$	.	...	...	09375	$\frac{3}{32}$	.	...	...	59375
$\frac{7}{64}$	.	...	...	109375	$\frac{7}{64}$	.	...	...	609375
$\frac{1}{4}$	.	...	...	125	$\frac{1}{4}$	.	...	...	625
$\frac{9}{64}$	.	...	...	140625	$\frac{9}{64}$	.	...	...	640625
$\frac{5}{32}$	.	...	...	15625	$\frac{5}{32}$	.	...	...	65625
$\frac{11}{64}$	.	...	...	171875	$\frac{11}{64}$	.	...	...	671875
$\frac{3}{16}$	.	...	...	1875	$\frac{3}{16}$	.	...	...	6875
$\frac{13}{64}$	.	...	...	203125	$\frac{13}{64}$	.	...	...	703125
$\frac{7}{32}$	.	...	...	21875	$\frac{7}{32}$	.	...	...	71875
$\frac{15}{64}$	.	...	...	234375	$\frac{15}{64}$	.	...	...	734375
$\frac{1}{2}$	.	...	...	25	$\frac{1}{2}$	.	...	...	75
$\frac{17}{64}$	.	...	...	265625	$\frac{17}{64}$	.	...	...	765625
$\frac{9}{32}$	.	...	...	28125	$\frac{9}{32}$	.	...	...	78125
$\frac{19}{64}$	.	...	...	296875	$\frac{19}{64}$	.	...	...	796875
$\frac{5}{16}$	.	...	...	3125	$\frac{5}{16}$	.	...	...	8125
$\frac{21}{64}$	.	...	...	328125	$\frac{21}{64}$	.	...	...	828125
$\frac{11}{32}$	.	...	...	34375	$\frac{11}{32}$	.	...	...	84375
$\frac{23}{64}$	.	...	...	359375	$\frac{23}{64}$	.	...	...	859375
$\frac{3}{8}$	.	...	...	375	$\frac{3}{8}$	.	...	...	875
$\frac{25}{64}$	.	...	...	390625	$\frac{25}{64}$	.	...	...	890625
$\frac{13}{32}$	.	...	...	40625	$\frac{13}{32}$	.	...	...	90625
$\frac{27}{64}$	.	...	...	421875	$\frac{27}{64}$	.	...	...	921875
$\frac{7}{16}$	.	...	...	4375	$\frac{7}{16}$	.	...	...	9375
$\frac{29}{64}$	.	...	...	453125	$\frac{29}{64}$	.	...	...	953125
$\frac{15}{32}$	.	...	...	46875	$\frac{15}{32}$	.	...	...	96875
$\frac{31}{64}$	.	...	...	484375	$\frac{31}{64}$	.	...	...	984375
$\frac{1}{2}$	.	...	...	5	$\frac{1}{2}$	.	...	...	1 00

DORMAN, LONG & CO. LIMITED.

MOMENTS OF INERTIA, OF VARIOUS SECTIONS.

Sections	Moments of Inertia about xx	Sections	Moments of Inertia about xx
	$\frac{B \cdot D^3}{12}$		$\frac{\pi (D^4 - d^4)}{64} = .0491 (D^4 - d^4)$
	$\frac{B \cdot D^3}{3}$		$\frac{B \cdot D^3}{36}$
	$\frac{B (D^3 - d^3)}{12}$		$\frac{B \cdot D^3}{12}$
	$\frac{\pi D^4}{64} = .0491 D^4$		$\frac{B \cdot D^3}{4}$

AREAS OF SMALL CIRCLES, ADVANCING BY 32ND'S OF AN INCH.

Diameter in inches	Area in square inches	Diameter in inches	Area in square inches	Diameter in inches	Area in square inches	Diameter in inches	Area in square inches
.. 1/2	.0008	.. 3/2	.0621	.. 3 1/2	.2217	.. 3 1/2	.4794
1/8 ..	.0031	1/6 ..	.0767	3/8 ..	.2485	3 3/8 ..	.5185
.. 3/8	.0069	.. 1/2	.0928	.. 1/2	.2769	.. 1/2	.5591
1/4 ..	.0123	3/4 ..	.1104	3/4 ..	.3068	1 1/4 ..	.6013
.. 5/8	.0192	.. 1 1/4	.1296	.. 1 1/4	.3382	.. 1 1/4	.6450
3/8 ..	.0276	7/8 ..	.1503	1 1/8 ..	.3712	1 1/8 ..	.6903
.. 7/8	.0376	.. 1 1/2	.1726	.. 1 1/2	.4057	.. 1 1/2	.7371
1/4 ..	.0491	1 1/2 ..	.1963	3/4 ..	.4418	1 ..	.7854

DORMAN, LONG & CO. LIMITED.

AREAS OF CIRCLES ADVANCING BY EIGHTHS.

Diameter	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0		·012	·049	·110	·196	·307	·442	·601
1	·785	·994	1·227	1·485	1·767	2·074	2·405	2·761
2	3·142	3·547	3·976	4·430	4·909	5·412	5·940	6·492
3	7·069	7·670	8·296	8·946	9·621	10·321	11·045	11·793
4	12·566	13·364	14·186	15·033	15·904	16·800	17·721	18·665
5	19·635	20·629	21·643	22·691	23·758	24·850	25·957	27·109
6	28·274	29·465	30·680	31·919	33·183	34·472	35·785	37·122
7	38·435	39·871	41·332	42·718	44·179	45·664	47·173	48·707
8	50·265	51·843	53·456	55·088	56·745	58·426	60·132	61·862
9	63·617	65·337	67·093	68·829	70·582	72·360	74·162	76·539
10	78·540	80·516	82·516	84·541	86·590	88·664	90·765	92·896
11	95·033	97·205	99·402	101·62	103·87	106·14	108·43	110·75
12	113·10	115·47	117·86	120·28	122·72	125·19	127·68	130·19
13	132·73	135·30	137·88	140·50	143·14	145·80	148·49	151·20
14	153·94	156·70	159·48	162·30	165·13	167·99	170·87	173·78
15	176·71	179·67	182·65	185·66	188·69	191·75	194·83	197·93
16	201·06	204·22	207·39	210·60	213·82	217·08	220·35	223·65
17	226·98	230·33	233·71	237·10	240·52	243·96	247·45	250·96
18	254·47	258·02	261·59	265·18	268·80	272·45	276·12	279·81
19	283·53	287·27	291·04	294·83	298·65	302·49	306·35	310·24
20	314·16	318·10	322·06	326·05	330·06	334·10	338·16	342·25
21	346·36	350·50	354·66	358·84	363·05	367·28	371·54	375·83
22	380·13	384·46	388·82	393·20	397·61	402·04	406·49	410·97
23	415·48	420·00	424·56	429·13	433·74	438·39	443·01	447·69
24	452·39	457·11	461·86	466·64	471·44	476·26	481·11	485·98
25	490·37	495·79	500·74	505·71	510·71	515·72	520·77	525·84
26	530·93	536·05	541·19	546·35	551·55	556·76	562·00	567·27
27	572·56	577·87	583·21	588·57	593·96	599·37	604·81	610·27
28	615·75	621·26	626·80	632·36	637·94	643·55	649·18	654·84
29	660·52	666·23	671·96	677·71	683·49	689·30	695·13	700·98
30	706·36	712·76	718·69	724·64	730·62	736·62	742·64	748·69
31	754·77	760·87	766·99	773·14	779·31	785·51	791·73	797·98
32	804·25	810·54	816·86	823·21	829·58	835·97	842·39	848·83
33	855·30	861·79	868·31	874·85	881·42	888·00	894·62	901·26
34	907·92	914·61	921·32	928·06	934·82	941·61	948·42	955·25
35	962·11	969·00	975·91	982·84	989·80	996·78	1003·8	1010·8
36	1017·9	1025·0	1032·1	1039·2	1046·3	1053·5	1060·7	1068·0
37	1075·2	1082·5	1089·8	1097·1	1104·5	1111·8	1119·2	1126·7
38	1134·1	1141·6	1149·1	1156·6	1164·2	1171·7	1179·3	1186·9
39	1194·6	1202·3	1210·0	1217·7	1225·4	1233·2	1241·0	1248·8
40	1256·6	1264·5	1272·4	1280·3	1288·2	1296·2	1304·2	1312·2
41	1320·3	1328·3	1336·4	1344·5	1352·7	1360·8	1369·0	1377·2
42	1385·4	1393·7	1402·0	1410·3	1418·6	1427·0	1435·4	1443·8
43	1452·2	1460·7	1469·1	1477·6	1486·2	1494·7	1503·3	1511·9
44	1520·5	1529·2	1537·9	1546·6	1555·3	1564·0	1572·8	1581·6
45	1590·4	1599·3	1608·2	1617·0	1626·0	1634·9	1643·9	1652·9
46	1661·9	1670·9	1680·0	1689·1	1698·2	1707·4	1716·5	1725·7
47	1734·9	1744·2	1753·5	1762·7	1772·1	1781·4	1790·8	1800·1
48	1809·6	1819·0	1828·5	1837·9	1847·5	1857·0	1866·5	1876·1
49	1885·7	1895·4	1905·0	1914·7	1924·4	1934·2	1943·9	1953·7
50	1963·5	1973·3	1983·2	1993·1	2003·0	2012·9	2022·8	2032·8

DORMAN, LONG & CO. LIMITED.

AREAS OF CIRCLES ADVANCING BY EIGHTHS.

Diameter	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
51	2042.8	2052.8	2062.9	2073.0	2083.1	2093.2	2103.3	2113.5
52	2123.7	2133.9	2144.2	2154.5	2164.8	2175.1	2185.4	2195.8
53	2206.2	2216.6	2227.0	2237.5	2248.0	2258.5	2269.1	2279.6
54	2290.2	2300.8	2311.5	2322.1	2332.8	2343.5	2354.3	2365.0
55	2375.8	2386.6	2397.5	2408.3	2419.2	2430.1	2441.1	2452.0
56	2463.0	2474.0	2485.0	2496.1	2507.2	2518.3	2529.4	2540.6
57	2551.8	2563.0	2574.2	2585.4	2596.7	2608.0	2619.4	2630.7
58	2642.1	2653.5	2664.9	2676.4	2687.8	2699.3	2710.9	2722.4
59	2754.0	2765.6	2777.2	2788.8	2799.5	2810.2	2820.9	2831.7
60	2827.4	2839.2	2851.0	2862.9	2874.8	2886.6	2898.6	2910.5
61	2922.5	2934.5	2946.5	2958.5	2970.6	2982.7	2994.8	3006.9
62	3019.1	3031.3	3043.5	3055.7	3068.0	3080.3	3092.6	3104.9
63	3117.2	3129.6	3142.0	3154.5	3167.9	3179.4	3191.9	3204.4
64	3217.0	3229.6	3242.2	3254.8	3267.5	3280.1	3292.8	3305.6
65	3318.3	3331.1	3343.9	3356.7	3369.6	3382.4	3395.3	3408.2
66	3421.2	3434.2	3447.2	3460.2	3473.2	3486.3	3499.4	3512.5
67	3525.7	3538.8	3552.0	3565.2	3578.5	3591.7	3605.0	3618.3
68	3631.7	3645.0	3658.4	3671.8	3685.3	3698.7	3712.2	3725.7
69	3738.3	3752.8	3766.4	3780.0	3793.7	3807.3	3821.0	3834.7
70	3845.5	3862.2	3876.0	3890.8	3905.6	3919.5	3934.4	3949.3
71	3959.2	3975.1	3997.1	4009.1	4021.2	4033.3	4045.4	4057.4
72	4071.5	4087.7	4103.8	4119.0	4134.2	4149.5	4164.8	4179.1
73	4185.4	4199.7	4214.1	4228.5	4242.9	4257.4	4271.8	4286.3
74	4300.8	4315.4	4329.9	4344.5	4359.2	4373.8	4388.5	4403.2
75	4417.9	4432.6	4447.4	4462.2	4477.0	4491.8	4506.7	4521.5
76	4536.5	4551.4	4566.4	4581.3	4596.3	4611.4	4626.4	4641.5
77	4656.6	4671.8	4686.9	4702.1	4717.3	4732.5	4747.8	4763.1
78	4778.4	4793.7	4809.0	4824.4	4839.8	4855.2	4870.7	4886.2
79	4901.7	4917.2	4932.7	4948.3	4963.9	4979.5	4995.2	5010.9
80	5026.5	5042.3	5058.0	5073.8	5089.6	5105.4	5121.2	5137.1
81	5153.0	5169.9	5184.9	5200.8	5216.8	5232.8	5248.9	5264.9
82	5281.0	5297.1	5313.3	5329.4	5345.6	5361.8	5378.1	5394.3
83	5410.6	5426.9	5443.3	5459.6	5476.0	5492.4	5508.8	5525.3
84	5551.8	5558.3	5574.8	5591.4	5607.9	5624.5	5641.2	5657.8
85	5674.5	5691.2	5707.9	5724.7	5741.5	5758.3	5775.1	5791.9
86	5808.8	5825.7	5842.6	5859.6	5876.5	5893.5	5910.6	5927.6
87	5944.7	5961.8	5978.9	5996.0	6013.2	6030.4	6047.6	6064.9
88	6082.1	6099.4	6116.7	6134.1	6151.4	6168.8	6186.2	6203.7
89	6221.1	6238.6	6256.1	6273.7	6291.2	6308.8	6326.4	6344.1
90	6361.7	6379.4	6397.1	6414.9	6432.6	6450.4	6468.2	6486.0
91	6503.9	6521.8	6539.7	6557.6	6575.5	6593.5	6611.5	6629.6
92	6647.6	6665.7	6683.8	6701.9	6720.1	6738.2	6756.4	6774.7
93	6792.9	6811.2	6829.5	6847.8	6866.1	6884.5	6902.9	6921.3
94	6939.8	6958.2	6976.7	6995.3	7013.8	7032.4	7051.0	7069.6
95	7088.2	7106.9	7125.6	7144.3	7163.0	7181.8	7200.6	7219.4
96	7238.2	7257.1	7276.0	7294.9	7313.8	7332.8	7351.8	7370.8
97	7389.8	7408.9	7428.0	7447.1	7466.2	7485.3	7504.5	7523.7
98	7543.0	7562.2	7581.5	7600.8	7620.1	7639.5	7658.9	7678.3
99	7697.7	7717.1	7736.6	7756.1	7775.6	7795.2	7814.8	7834.4
100	7854.0	7873.6	7893.3	7913.0	7932.7	7952.5	7972.2	7992.0

DORMAN, LONG & CO. LIMITED.

CIRCUMFERENCES OF CIRCLES ADVANCING
BY EIGHTHS.

Diameter	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0		3.393	3.795	1.178	1.571	1.963	2.356	2.749
1	3.142	3.534	3.927	4.320	4.712	5.105	5.498	5.890
2	6.283	6.776	7.069	7.461	7.854	8.247	8.639	9.032
3	9.425	9.817	10.210	10.603	10.996	11.388	11.781	12.174
4	12.566	12.959	13.352	13.744	14.137	14.530	14.923	15.315
5	15.708	16.101	16.493	16.886	17.279	17.671	18.064	18.457
6	18.850	19.242	19.635	20.028	20.420	20.813	21.206	21.598
7	21.991	22.384	22.777	23.169	23.562	23.955	24.347	24.740
8	25.133	25.525	25.918	26.311	26.704	27.096	27.489	27.882
9	28.274	28.667	29.060	29.452	29.845	30.238	30.631	31.023
10	31.416	31.809	32.201	32.594	32.987	33.379	33.772	34.165
11	34.558	34.950	35.343	35.736	36.128	36.521	36.914	37.306
12	37.699	38.092	38.485	38.877	39.270	39.663	40.055	40.448
13	40.841	41.233	41.626	42.019	42.412	42.804	43.197	43.590
14	43.982	44.375	44.768	45.160	45.553	45.946	46.338	46.731
15	47.124	47.517	47.909	48.302	48.695	49.087	49.480	49.873
16	50.265	50.658	51.051	51.444	51.836	52.229	52.622	53.014
17	53.407	53.800	54.192	54.585	54.978	55.371	55.763	56.156
18	56.549	56.941	57.334	57.727	58.119	58.512	58.905	59.298
19	59.690	60.083	60.476	60.868	61.261	61.654	62.046	62.439
20	62.832	63.225	63.617	64.010	64.403	64.795	65.188	65.581
21	65.973	66.366	66.759	67.152	67.544	67.937	68.330	68.722
22	69.115	69.508	69.900	70.293	70.686	71.079	71.471	71.864
23	72.257	72.649	73.042	73.435	73.827	74.220	74.613	75.006
24	75.398	75.791	76.184	76.576	76.969	77.362	77.754	78.147
25	78.540	78.933	79.325	79.718	80.111	80.503	80.896	81.289
26	81.681	82.074	82.467	82.860	83.252	83.645	84.038	84.430
27	84.823	85.216	85.608	86.001	86.394	86.786	87.179	87.572
28	87.965	88.357	88.750	89.143	89.535	89.928	90.321	90.713
29	91.106	91.499	91.892	92.284	92.677	93.070	93.462	93.855
30	94.248	94.640	95.033	95.426	95.819	96.211	96.604	96.997
31	97.389	97.782	98.175	98.567	98.960	99.353	99.746	100.14
32	100.53	100.92	101.32	101.71	102.10	102.49	102.89	103.28
33	103.67	104.07	104.46	104.85	105.24	105.64	106.03	106.42
34	106.81	107.21	107.60	107.99	108.38	108.78	109.17	109.56
35	109.96	110.35	110.74	111.13	111.53	111.92	112.31	112.70
36	113.10	113.49	113.88	114.28	114.67	115.06	115.45	115.85
37	116.24	116.63	117.02	117.42	117.81	118.20	118.60	118.99
38	119.38	119.77	120.17	120.56	120.95	121.34	121.74	122.13
39	122.52	122.91	123.31	123.70	124.09	124.48	124.88	125.27
40	125.66	126.06	126.45	126.84	127.23	127.63	128.02	128.41
41	128.81	129.20	129.59	129.98	130.38	130.77	131.16	131.55
42	131.96	132.34	132.73	133.12	133.52	133.91	134.30	134.70
43	135.09	135.48	135.87	136.27	136.66	137.05	137.44	137.84
44	138.23	138.62	139.02	139.41	139.80	140.19	140.59	140.98
45	141.37	141.76	142.16	142.55	142.94	143.34	143.73	144.12
46	144.51	144.91	145.30	145.69	146.08	146.48	146.87	147.26
47	147.65	148.05	148.44	148.83	149.23	149.62	150.01	150.40
48	150.80	151.19	151.58	151.97	152.37	152.76	153.15	153.55
49	153.94	154.33	154.72	155.12	155.51	155.90	156.29	156.69
50	157.08	157.47	157.86	158.26	158.65	159.04	159.44	159.83

DORMAN, LONG & CO. LIMITED.

CIRCUMFERENCES OF CIRCLES ADVANCING
BY EIGHTHS.

Diameter	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
51	160 22	160 61	161 01	161 40	161 79	162 18	162 58	162 97
52	164 35	163 76	164 15	164 54	164 93	165 33	165 72	166 11
53	166 50	166 90	167 29	167 68	168 08	168 47	168 86	169 25
54	169 65	170 04	170 43	170 82	171 22	171 61	172 00	172 39
55	172 79	173 18	173 57	173 97	174 36	174 75	175 14	175 54
56	175 93	176 32	176 71	177 11	177 50	177 89	178 29	178 68
57	179 07	179 46	179 86	180 25	180 64	181 03	181 43	181 82
58	182 21	182 61	183 00	183 39	183 78	184 18	184 57	184 96
59	185 35	185 75	186 14	186 53	186 92	187 32	187 71	188 10
60	188 50	188 89	189 28	189 67	190 07	190 46	190 85	191 24
61	191 64	192 03	192 42	192 82	193 21	193 60	193 99	194 39
62	194 78	195 17	195 56	195 96	196 35	196 74	197 13	197 53
63	197 92	198 31	198 71	199 10	199 49	199 88	200 28	200 67
64	201 05	201 45	201 85	202 24	202 63	203 03	203 42	203 81
65	204 20	204 60	204 99	205 38	205 77	206 17	206 56	206 95
66	207 35	207 74	208 13	208 52	208 92	209 31	209 70	210 09
67	210 49	210 88	211 27	211 66	212 05	212 45	212 84	213 24
68	213 63	214 02	214 41	214 81	215 20	215 59	215 98	216 38
69	216 77	217 16	217 56	217 95	218 34	218 73	219 13	219 52
70	219 91	220 30	220 70	221 09	221 48	221 87	222 27	222 66
71	223 05	223 45	223 84	224 23	224 62	225 02	225 41	225 80
72	226 19	226 59	226 98	227 37	227 77	228 16	228 55	228 94
73	229 34	229 73	230 12	230 51	230 91	231 30	231 69	232 09
74	232 48	232 87	233 26	233 66	234 05	234 44	234 83	235 23
75	235 62	236 01	236 40	236 80	237 19	237 58	237 98	238 37
76	238 76	239 15	239 54	239 94	240 33	240 72	241 12	241 51
77	241 90	242 30	242 69	243 08	243 47	243 87	244 26	244 65
78	245 04	245 44	245 83	246 22	246 62	247 01	247 40	247 79
79	248 19	248 58	248 97	249 36	249 76	250 15	250 54	250 93
80	251 33	251 72	252 11	252 51	252 90	253 29	253 68	254 08
81	254 47	254 86	255 25	255 65	256 04	256 43	256 83	257 22
82	257 61	258 00	258 40	258 79	259 18	259 57	259 97	260 36
83	260 75	261 14	261 54	261 93	262 32	262 72	263 11	263 50
84	263 89	264 29	264 68	265 07	265 46	265 86	266 25	266 64
85	267 04	267 43	267 82	268 21	268 61	269 00	269 39	269 78
86	270 18	270 57	270 96	271 36	271 75	272 14	272 53	272 93
87	273 32	273 71	274 10	274 50	274 89	275 28	275 67	276 07
88	276 46	276 85	277 25	277 64	278 03	278 42	278 82	279 21
89	279 60	279 99	280 39	280 78	281 17	281 57	281 96	282 35
90	282 74	283 14	283 53	283 92	284 31	284 71	285 10	285 49
91	286 38	286 78	287 17	287 56	287 95	288 35	288 74	289 13
92	289 03	289 43	289 81	290 20	290 60	290 99	291 38	291 78
93	292 17	292 56	292 95	293 35	293 74	294 13	294 52	294 92
94	295 31	295 70	296 10	296 49	296 88	297 27	297 67	298 06
95	298 45	298 84	299 24	299 63	300 02	300 41	300 81	301 20
96	301 59	301 99	302 38	302 77	303 16	303 56	303 95	304 34
97	304 73	305 13	305 52	305 91	306 31	306 70	307 09	307 48
98	307 87	308 27	308 66	309 05	309 45	309 84	310 23	310 62
99	311 02	311 41	311 80	312 20	312 59	312 98	313 37	313 77
100	314 16	314 55	314 94	315 34	315 73	316 12	316 52	316 91

DORMAN, LONG & CO. LIMITED.

SQUARES OF NUMBERS AND FRACTIONAL PARTS.

No	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0		0156	0625	1406	2500	3306	5625	7656
1	1	1 2656	1 5625	1 906	2 2500	2 6406	3 0625	3 5156
2	4	4 5156	5 0625	5 6406	6 2500	6 8906	7 5625	8 2656
3	9	9 7656	10 5625	11 906	12 2500	13 1406	14 0625	15 0156
4	16	17 0156	1 0625	13 1406	20 2500	21 306	22 5625	23 7656
5	25	26 2656	27 5625	28 906	30 2500	31 6406	33 0625	34 5156
6	36	37 106	39 06	40 6406	42 2500	43 306	45 5625	47 2656
7	49	50 7656	52 5625	54 306	56 2500	58 1406	60 0625	62 0156
8	64	66 0156	69 0625	70 1406	72 2500	74 306	76 5625	78 7656
9	81	83 2656	85 5625	87 906	90 2500	92 6406	95 0625	97 106
10	100	102 106	104 0625	106 6406	110 2500	112 306	115 5625	118 7656
11	121	123 7656	126 5625	129 306	132 2500	135 1406	139 0625	141 0156
12	144	147 0156	150 0625	153 1406	156 2500	159 306	162 5625	165 7656
13	169	172 2656	175 5625	178 906	182 2500	185 6406	189 0625	192 5156
14	196	199 106	203 0625	206 6406	210 2500	213 306	217 5625	221 7656
15	225	228 7656	232 5625	236 906	240 2500	244 1406	248 0625	252 0156
16	256	260 0156	264 0625	268 1406	272 2500	276 306	280 5625	284 7656
17	289	293 2656	297 5625	301 906	306 2500	310 6406	314 0625	318 5156
18	324	328 5156	333 0625	337 6406	342 2500	346 306	351 5625	355 7656
19	361	365 7656	370 5625	375 906	380 2500	384 1406	389 0625	394 0156
20	400	404 0156	409 0625	414 1406	419 2500	424 306	429 5625	434 7656
21	441	445 2656	450 5625	455 906	460 2500	465 6406	470 0625	475 5156
22	484	488 5156	493 0625	498 1406	503 2500	508 306	513 5625	518 7656
23	529	533 7656	538 5625	543 906	548 2500	553 6406	558 0625	563 5156
24	576	580 0156	585 0625	590 1406	595 2500	600 306	605 5625	610 7656
25	625	629 2656	634 5625	639 906	645 2500	650 6406	655 0625	660 5156
26	676	680 5156	685 0625	690 1406	695 2500	700 306	705 5625	710 7656
27	729	733 7656	738 5625	743 906	748 2500	753 6406	758 0625	763 5156
28	784	788 0156	793 0625	798 1406	803 2500	808 306	813 5625	818 7656
29	841	845 2656	850 5625	855 906	860 2500	865 6406	870 0625	875 5156
30	900	904 5156	909 0625	914 1406	919 2500	924 306	929 5625	934 7656

DORMAN, LONG & CO. LIMITED.

SQUARES OF NUMBERS AND FRACTIONAL PARTS.

No.	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
31	961	968·7656	976·5625	984·3906	992·2500	1000·1406	1008·0625	1016·0156
32	1024	1032·0156	1040·0625	1048·1406	1056·2500	1064·3906	1072·5625	1080·7656
33	1089	1097·2656	1105·5625	1113·8906	1122·2500	1130·6406	1139·0625	1147·5156
34	1156	1164·5156	1173·0625	1181·6406	1190·2500	1198·8906	1207·5625	1216·2656
35	1225	1233·7656	1242·5625	1251·3906	1260·2500	1269·1406	1278·0625	1287·0156
36	1296	1305·0156	1314·0625	1323·1406	1332·2500	1341·3906	1350·5625	1359·7656
37	1369	1377·2656	1387·5625	1396·8906	1406·2500	1415·6406	1425·0625	1434·5156
38	1444	1453·5156	1463·0625	1472·6406	1482·2500	1491·8906	1501·5625	1511·2656
39	1521	1530·7656	1540·5625	1550·3906	1560·2500	1570·1406	1580·0625	1590·0156
40	1600	1610·0156	1620·0625	1630·1406	1640·2500	1650·3906	1660·5625	1670·7656
41	1681	1691·2656	1701·5625	1711·8906	1722·2500	1732·6406	1743·0625	1753·5156
42	1764	1774·5156	1785·0625	1795·6406	1806·2500	1816·8906	1827·5625	1838·2656
43	1849	1859·7656	1870·5625	1881·3906	1892·2500	1903·1406	1914·0625	1925·0156
44	1936	1947·0156	1958·0625	1969·1406	1980·2500	1991·3906	2002·5625	2013·7656
45	2025	2036·2656	2047·5625	2058·8906	2070·2500	2081·6406	2093·0625	2104·5156
46	2116	2127·5156	2139·0625	2150·6406	2162·2500	2173·8906	2185·5625	2197·2656
47	2209	2220·7656	2232·5625	2244·3906	2256·2500	2268·1406	2280·0625	2292·0156
48	2304	2316·0156	2328·0625	2340·1406	2352·2500	2364·3906	2376·5625	2388·7656
49	2401	2413·2656	2425·5625	2437·8906	2450·2500	2462·6406	2475·0625	2487·5156
50	2500	2512·5156	2525·0625	2537·6406	2550·2500	2562·8906	2575·5625	2588·2656
51	2601	2613·7656	2626·5625	2639·3906	2652·2500	2665·1406	2678·0625	2691·0156
52	2704	2717·0156	2730·0625	2743·1406	2756·2500	2769·3906	2782·5625	2795·7656
53	2809	2822·2656	2835·5625	2848·8906	2862·2500	2875·6406	2889·0625	2902·5156
54	2916	2929·5156	2943·0625	2956·6406	2970·2500	2983·8906	2997·5625	3011·2656
55	3025	3038·7656	3052·5625	3066·3906	3080·2500	3094·1406	3108·0625	3122·0156
56	3136	3150·0156	3164·0625	3178·1406	3192·2500	3206·3906	3220·5625	3234·7656
57	3249	3263·2656	3277·5625	3291·8906	3306·2500	3320·6406	3335·0625	3349·5156
58	3364	3378·5156	3393·0625	3407·6406	3422·2500	3436·8906	3451·5625	3466·2656
59	3481	3495·7656	3510·5625	3525·3906	3540·2500	3555·1406	3570·0625	3585·0156
60	3600	3615·0156	3630·0625	3645·1406	3660·2500	3675·3906	3690·5625	3705·7656

DORMAN, LONG & CO. LIMITED.

CUBES OF NUMBERS AND FRACTIONAL PARTS.

No.	$\cdot 0$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0	.	.002	.016	.053	.125	.244	.422	.670
1	1	1.424	1.953	2.600	3.375	4.291	5.359	6.592
2	8	9.596	11.391	13.396	15.625	18.088	20.797	23.764
3	27	30.518	34.323	38.443	42.875	47.635	52.734	58.186
4	64	70.189	76.766	83.740	91.125	98.932	107.172	115.857
5	125	134.611	144.703	155.237	166.375	177.979	190.109	202.779
6	216	229.735	244.141	259.084	274.625	290.775	307.547	324.951
7	343	361.705	381.078	401.151	421.875	443.322	465.484	488.373
8	512	535.377	561.516	589.423	614.125	641.619	669.922	699.045
9	729	759.739	791.453	823.975	857.375	891.666	926.859	962.967
10	1000	1037.971	1076.891	1116.771	1157.625	1199.465	1242.297	1286.139
11	1331	1376.893	1423.828	1471.813	1520.875	1571.010	1622.234	1674.561
12	1728	1782.564	1833.266	1885.115	1938.125	2012.307	2072.672	2134.232
13	2197	2260.906	2326.203	2392.662	2460.375	2529.354	2599.609	2671.154
14	2744	2818.152	2893.641	2970.459	3048.625	3128.150	3209.047	3291.326
15	3375	3460.080	3546.578	3634.506	3723.875	3814.697	3906.984	4000.748
16	4096	4192.752	4291.016	4390.803	4492.125	4594.994	4699.422	4805.420
17	4913	5022.174	5132.953	5245.350	5359.375	5475.041	5592.359	5711.342
18	5832	5954.346	6078.391	6204.146	6331.625	6460.933	6591.797	6724.514
19	6859	6995.263	7133.320	7273.193	7414.875	7558.385	7703.734	7850.936
20	8000	8150.939	8305.766	8458.490	8615.125	8773.682	8934.172	9096.607
21	9261	9427.561	9595.703	9766.057	9938.375	10112.729	10289.109	10467.529
22	10648	10830.555	11015.441	11201.834	11390.625	11581.525	11774.547	11969.701
23	12167	12366.455	12568.078	12771.931	12977.875	13186.072	13396.484	13609.123
24	13824	14041.127	14260.516	14482.173	14706.125	14932.369	15160.922	15391.795
25	15625	15960.549	16308.453	16658.725	16931.375	16826.416	17073.859	17323.717
26	17576	17830.721	18087.891	18347.521	18609.625	18874.213	19141.297	19410.889
27	19683	19957.643	20234.823	20514.568	20796.875	21081.760	21369.234	21659.311
28	21952	22247.315	22545.266	22845.865	23149.125	23455.057	23763.672	24074.982
29	24389	24705.736	25025.203	25347.412	25672.375	26000.104	26330.609	26663.904
30	27000	27338.908	27680.641	28025.209	28372.625	28722.900	29076.047	29432.076

DORMAN, LONG & CO. LIMITED.

CUBES OF NUMBERS AND FRACTIONAL PARTS.

No	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
31	29791	30152.83	30517.58	30885.26	31255.87	31629.45	32005.98	32385.50
32	32768	33153.50	33542.02	33933.55	34328.12	34725.74	35126.42	35530.17
33	35937	36346.92	36759.95	37176.10	37595.37	38017.79	38443.36	38872.09
34	39394	39739.10	40177.30	40618.90	41063.62	41511.59	41962.80	42417.26
35	42275	43353.02	43800.33	44267.94	44738.87	45213.13	45690.73	46171.69
36	46656	47143.69	47634.77	48129.24	48627.12	49128.43	49633.17	50141.36
37	50653	51168.11	51696.70	52208.79	52734.37	53263.48	53796.11	54332.28
38	54872	55415.28	55963.14	56512.53	57066.62	57624.28	58195.55	58750.45
39	59319	59891.21	60467.83	61046.63	61629.37	62216.32	62807.48	63401.87
40	64000	64601.83	65207.52	65816.93	66430.12	67047.12	67667.92	68292.54
41	68921	69533.30	70149.45	70769.47	71393.37	72021.17	72772.36	73428.47
42	74000	74751.47	75418.89	76090.27	76765.62	77444.96	78128.30	78815.64
43	79307	80202.39	80904.23	81605.32	82312.87	83024.61	83740.23	84460.06
44	85184	85912.06	86644.27	87380.62	88121.12	88865.81	89614.67	90367.73
45	91125	91836.49	92652.20	93422.16	94195.37	94974.85	95757.61	96544.65
46	97336	98131.66	98931.64	99735.96	100544.62	101357.65	102175.05	102995.83
47	103823	104653.59	105488.58	106328.01	107171.97	108020.20	108872.98	109730.25
48	110592	111450.25	112329.02	113204.30	114084.12	114968.49	115857.42	116750.92
49	117649	118551.67	119458.95	120370.85	121287.37	122208.54	123134.36	124064.84
50	125000	125939.85	126884.39	127833.65	128787.62	129746.34	130709.80	131678.01
51	132651	133620.77	134611.33	135593.69	136590.37	137587.88	138589.73	139596.44
52	140608	141624.44	142645.77	143671.89	144703.12	145739.18	146780.17	147826.11
53	148877	149932.85	150993.70	152059.54	153130.37	154206.23	155287.11	156373.03
54	157464	158560.03	159661.14	160767.33	161878.62	162995.03	164116.55	165243.20
55	166375	167511.96	168654.08	169801.33	170953.87	172111.57	173274.48	174442.62
56	175616	176794.63	177978.52	179167.68	180362.12	181561.87	182766.92	183977.29
57	185193	186414.05	187640.45	188872.22	190109.37	191351.92	192599.86	193853.22
58	195112	196376.22	197645.89	198921.02	200201.62	201487.71	202779.30	204076.39
59	205379	206687.14	208000.83	209320.07	210644.87	211975.26	213311.23	214652.81
60	216000	217352.81	218711.27	220075.37	221445.12	222820.56	224201.67	225588.48

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root ✓	Cube Root ✓	No.	Square	Cube	Square Root ✓	Cube Root ✓
1	1	1	1.0000	1.0000	50	2500	125000	7.0711	3.6840
2	4	8	1.4142	1.2599	51	2601	132651	7.1414	3.7084
3	9	27	1.7321	1.4422	52	2704	140608	7.2111	3.7325
4	16	64	2.0000	1.5874	53	2809	148877	7.2801	3.7563
5	25	125	2.2361	1.7100	54	2916	157464	7.3485	3.7798
6	36	216	2.4495	1.8171	55	3025	166375	7.4162	3.8030
7	49	343	2.6458	1.9129	56	3136	175616	7.4833	3.8259
8	64	512	2.8284	2.0000	57	3249	185193	7.5498	3.8485
9	81	729	3.0000	2.0801	58	3364	195112	7.6158	3.8709
10	100	1000	3.1623	2.1544	59	3481	205379	7.6811	3.8930
11	121	1331	3.3166	2.2240	60	3600	216000	7.7460	3.9149
12	144	1728	3.4641	2.2894	61	3721	226961	7.8102	3.9365
13	169	2197	3.6056	2.3513	62	3844	238328	7.8740	3.9579
14	196	2744	3.7417	2.4101	63	3969	250047	7.9373	3.9791
15	225	3375	3.8730	2.4662	64	4096	262144	8.0000	4.0000
16	256	4096	4.0000	2.5198	65	4225	274625	8.0623	4.0207
17	289	4913	4.1131	2.5713	66	4356	287496	8.1240	4.0412
18	324	5832	4.2426	2.6207	67	4489	300763	8.1854	4.0615
19	361	6859	4.3589	2.6684	68	4624	314432	8.2462	4.0817
20	400	8000	4.4721	2.7144	69	4761	328509	8.3066	4.1016
21	441	9261	4.5826	2.7589	70	4900	343000	8.3666	4.1213
22	484	10648	4.6904	2.8020	71	5041	357911	8.4261	4.1408
23	529	12167	4.7958	2.8439	72	5184	373248	8.4853	4.1602
24	576	13824	4.8990	2.8845	73	5329	389017	8.5440	4.1793
25	625	15625	5.0000	2.9240	74	5476	405224	8.6023	4.1983
26	676	17576	5.0990	2.9625	75	5625	421875	8.6603	4.2172
27	729	19683	5.1962	3.0000	76	5776	438976	8.7178	4.2358
28	784	21952	5.2915	3.0366	77	5929	456533	8.7750	4.2543
29	841	24389	5.3852	3.0723	78	6084	474552	8.8318	4.2727
30	900	27000	5.4772	3.1072	79	6241	493039	8.8882	4.2908
31	961	29791	5.5673	3.1414	80	6400	512007	8.9443	4.3089
32	1024	32768	5.6669	3.1748	81	6561	531441	9.0000	4.3267
33	1089	35937	5.7446	3.2077	82	6724	551368	9.0554	4.3445
34	1156	39304	5.8310	3.2399	83	6889	571787	9.1104	4.3621
35	1225	42875	5.9161	3.2711	84	7056	592704	9.1652	4.3795
36	1296	46656	6.0000	3.3019	85	7225	614125	9.2195	4.3968
37	1369	50663	6.0823	3.3322	86	7396	636036	9.2735	4.4140
38	1444	54872	6.1644	3.3620	87	7569	658503	9.3274	4.4310
39	1521	59319	6.2450	3.3912	88	7744	681472	9.3803	4.4480
40	1600	64000	6.3245	3.4200	89	7921	704969	9.4340	4.4647
41	1681	68921	6.4031	3.4482	90	8100	729000	9.4868	4.4814
42	1764	74038	6.4807	3.4760	91	8281	753571	9.5394	4.4979
43	1849	79367	6.5574	3.5034	92	8464	778688	9.5917	4.5144
44	1936	85184	6.6332	3.5303	93	8649	804357	9.6437	4.5307
45	2025	91125	6.7082	3.5569	94	8836	830594	9.6954	4.5468
46	2116	97336	6.7823	3.5830	95	9025	857375	9.7468	4.5629
47	2209	103823	6.8557	3.6088	96	9216	884736	9.7980	4.5789
48	2304	110592	6.9282	3.6342	97	9409	912673	9.8489	4.5947
49	2401	117649	7.0000	3.6593	98	9604	941192	9.8995	4.6104
					99	9801	970299	9.9499	4.6261

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root ✓	Cube Root ✓	No.	Square	Cube	Square Root ✓	Cube Root ✓
100	10000	1000000	10·0000	4·6416	150	22500	3375000	12·2474	5·3133
101	10201	1030301	10·0499	4·6570	151	22801	3442851	12·2882	5·3251
102	10404	1061208	10·0985	4·6723	152	23104	3511808	12·3288	5·3368
103	10609	1092727	10·1489	4·6875	153	23409	3581577	12·3693	5·3485
104	10816	1124864	10·1980	4·7027	154	23716	3652264	12·4097	5·3601
105	11025	1157625	10·2470	4·7177	155	24025	3723575	12·4499	5·3717
106	11236	1191016	10·2956	4·7326	156	24336	3795616	12·4900	5·3832
107	11449	1225043	10·3441	4·7475	157	24649	3868893	12·5300	5·3947
108	11664	1259712	10·3923	4·7622	158	24964	3944312	12·5698	5·4061
109	11881	1295029	10·4403	4·7769	159	25281	4014679	12·6095	5·4175
110	12100	1331000	10·4881	4·7914	160	25600	4096000	12·6491	5·4288
111	12321	1367631	10·5357	4·8059	161	25921	4173201	12·6886	5·4401
112	12544	1405024	10·5830	4·8203	162	26244	4251528	12·7279	5·4514
113	12769	1442997	10·6301	4·8346	163	26569	4330747	12·7671	5·4626
114	12996	1481544	10·6771	4·8488	164	26896	4410944	12·8062	5·4737
115	13225	1520875	10·7238	4·8629	165	27225	4492125	12·8452	5·4848
116	13456	1560896	10·7703	4·8770	166	27556	4574296	12·8841	5·4959
117	13689	1601613	10·8167	4·8910	167	27889	4657463	12·9228	5·5069
118	13924	1643032	10·8628	4·9049	168	28224	4741632	12·9615	5·5178
119	14161	1685159	10·9087	4·9187	169	28561	4826809	13·0000	5·5288
120	14400	1728000	10·9545	4·9324	170	28900	4913000	13·0384	5·5397
121	14641	1771561	11·0000	4·9461	171	29241	5009211	13·0767	5·5505
122	14884	1815948	11·0454	4·9597	172	29584	5089448	13·1149	5·5613
123	15129	1860967	11·0905	4·9732	173	29929	5174717	13·1529	5·5721
124	15376	1906624	11·1355	4·9866	174	30276	5260024	13·1909	5·5828
125	15625	1953125	11·1803	5·0000	175	30625	5359375	13·2288	5·5934
126	15876	2000376	11·2250	5·0133	176	30976	5459776	13·2666	5·6041
127	16129	2048383	11·2694	5·0265	177	31329	5561233	13·3041	5·6147
128	16384	2097152	11·3137	5·0397	178	31684	5663752	13·3417	5·6252
129	16641	2146689	11·3578	5·0528	179	32041	5767339	13·3791	5·6357
130	16900	2197000	11·4018	5·0658	180	32400	5872000	13·4164	5·6462
131	17161	2248091	11·4455	5·0788	181	32761	5977741	13·4536	5·6567
132	17424	2299968	11·4891	5·0916	182	33124	6084568	13·4907	5·6671
133	17689	2352637	11·5326	5·1045	183	33489	6192487	13·5277	5·6774
134	17956	2406104	11·5758	5·1172	184	33856	6291504	13·5647	5·6877
135	18225	2460375	11·6190	5·1299	185	34225	6391625	13·6015	5·6980
136	18496	2515456	11·6619	5·1426	186	34596	6492856	13·6382	5·7083
137	18769	2571353	11·7047	5·1551	187	34969	6595203	13·6748	5·7185
138	19044	2628072	11·7473	5·1676	188	35344	6698672	13·7113	5·7287
139	19321	2685619	11·7898	5·1801	189	35721	6751269	13·7477	5·7388
140	19600	2744000	11·8322	5·1925	190	36100	6859000	13·7840	5·7489
141	19881	2803221	11·8743	5·2048	191	36481	6967871	13·8203	5·7590
142	20164	2863288	11·9164	5·2171	192	36864	7077888	13·8564	5·7690
143	20449	2924207	11·9583	5·2293	193	37249	7189057	13·8924	5·7790
144	20736	2985984	12·0000	5·2415	194	37636	7301384	13·9284	5·7890
145	21025	3048625	12·0416	5·2536	195	38025	7414875	13·9642	5·7989
146	21316	3112136	12·0830	5·2656	196	38416	7529536	14·0000	5·8088
147	21609	3176523	12·1244	5·2776	197	38809	7645373	14·0357	5·8186
148	21904	3241792	12·1655	5·2896	198	39204	7762392	14·0712	5·8285
149	22201	3307949	12·2066	5·3015	199	39601	7880599	14·1067	5·8383

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root
200	40000	8000000	14 1421	5 8480	250	62500	15625000	15 3114	6 2996
201	40401	8120601	14 1774	5 8578	251	63001	15813251	15 3430	6 3080
202	40804	8242408	14 2127	5 8675	252	63504	16003008	15 3745	6 3164
203	41209	8365427	14 2478	5 8771	253	64009	16194277	15 4060	6 3247
204	41616	8489664	14 2829	5 8868	254	64516	16387064	15 4374	6 3330
205	42025	8615125	14 3178	5 8964	255	65025	16581375	15 4687	6 3413
206	42436	8741816	14 3527	5 9059	256	65536	16777216	16 0000	6 3496
207	42849	8869743	14 3875	5 9155	257	66049	16974593	16 0312	6 3579
208	43264	8998912	14 4222	5 9250	258	66564	17173512	16 0621	6 3661
209	43681	9129329	14 4568	5 9345	259	67081	17373979	16 0935	6 3743
210	44100	9261000	14 4914	5 9439	260	67600	17576000	16 1245	6 3825
211	44521	9393931	14 5259	5 9533	261	68121	17780531	16 1555	6 3907
212	44944	9528128	14 5602	5 9627	262	68644	17987472	16 1864	6 3988
213	45369	9663597	14 5945	5 9721	263	69169	18194447	16 2173	6 4070
214	45796	9800344	14 6287	5 9814	264	69696	18403744	16 2481	6 4151
215	46225	9938375	14 6629	5 9907	265	70225	18614625	16 2788	6 4232
216	46656	10077696	14 6969	6 0000	266	70756	18827096	16 3095	6 4312
217	47089	10218313	14 7309	6 0092	267	71289	19041165	16 3401	6 4393
218	47524	10360232	14 7648	6 0185	268	71824	19248832	16 3707	6 4473
219	47961	10503459	14 7986	6 0277	269	72361	19458109	16 4012	6 4553
220	48400	10648000	14 8324	6 0369	270	72900	19669000	16 4317	6 4633
221	48841	10793861	14 8661	6 0459	271	73441	19880511	16 4621	6 4713
222	49284	10941048	14 8997	6 0550	272	73984	20092648	16 4924	6 4788
223	49729	11089567	14 9332	6 0641	273	74529	20306417	16 5227	6 4872
224	50176	11239424	14 9666	6 0732	274	75076	20520824	16 5529	6 4951
225	50625	11390625	15 0000	6 0822	275	75625	20736875	16 5831	6 5030
226	51076	11543176	15 0333	6 0912	276	76176	20953584	16 6132	6 5108
227	51529	11697083	15 0665	6 1002	277	76729	21170953	16 6433	6 5187
228	51984	11852352	15 0997	6 1091	278	77284	21389984	16 6733	6 5265
229	52441	12008989	15 1327	6 1180	279	77841	21717639	16 7033	6 5343
230	52900	12167000	15 1658	6 1269	280	78400	21952000	16 7332	6 5421
231	53361	12326391	15 1987	6 1358	281	78961	22188041	16 7631	6 5499
232	53824	12487168	15 2315	6 1446	282	79524	22425668	16 7929	6 5577
233	54289	12649337	15 2643	6 1534	283	80089	22664817	16 8226	6 5654
234	54756	12812904	15 2971	6 1622	284	80656	22906504	16 8523	6 5731
235	55225	12978975	15 3297	6 1710	285	81225	23149125	16 8819	6 5808
236	55696	13146556	15 3623	6 1797	286	81796	23393656	16 9115	6 5885
237	56169	13315653	15 3948	6 1885	287	82369	23639903	16 9411	6 5962
238	56644	13486272	15 4272	6 1972	288	82944	23887872	16 9706	6 6039
239	57121	13658419	15 4595	6 2058	289	83521	24137569	17 0000	6 6115
240	57600	13832000	15 4919	6 2145	290	84100	24388900	17 0294	6 6191
241	58081	13987521	15 5242	6 2231	291	84681	24642171	17 0587	6 6267
242	58564	14144483	15 5563	6 2317	292	85264	24897088	17 0880	6 6343
243	59049	14302897	15 5885	6 2403	293	85849	25153757	17 1172	6 6419
244	59536	14462874	15 6205	6 2488	294	86436	25411184	17 1464	6 6494
245	60025	14624425	15 6523	6 2573	295	87025	25670275	17 1756	6 6569
246	60516	14786656	15 6844	6 2658	296	87616	25930936	17 2047	6 6644
247	61009	15069223	15 7162	6 2743	297	88209	26193073	17 2337	6 6719
248	61504	15252992	15 7480	6 2828	298	88804	26456592	17 2627	6 6794
249	62001	15438249	15 7797	6 2912	299	89401	26730899	17 2916	6 6869

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root ✓	Cube Root ✓	No.	Square	Cube	Square Root ✓	Cube Root ✓
300	90000	27000000	17.3205	6.6943	350	122500	42875000	18.7083	7.0473
301	90601	27270901	17.3494	6.7018	351	123201	43245551	18.7350	7.0540
302	91204	27543608	17.3781	6.7092	352	123904	43614208	18.7617	7.0607
303	91809	27818127	17.4069	6.7166	353	124609	43986977	18.7883	7.0674
304	92416	28094464	17.4356	6.7240	354	125316	44361364	18.8149	7.0740
305	93025	28372625	17.4642	6.7313	355	126025	44738875	18.8414	7.0807
306	93636	28652616	17.4929	6.7387	356	126736	45119016	18.8680	7.0873
307	94249	28934443	17.5214	6.7460	357	127449	45499233	18.8944	7.0940
308	94864	29218112	17.5499	6.7533	358	128164	45882712	18.9209	7.1006
309	95481	29503629	17.5784	6.7606	359	128881	46266279	18.9473	7.1072
310	96100	29791000	17.6068	6.7679	360	129600	46656000	18.9737	7.1138
311	96721	30080231	17.6352	6.7752	361	130321	47045381	19.0000	7.1204
312	97344	30371328	17.6635	6.7824	362	131044	47437928	19.0263	7.1269
313	97969	30664297	17.6918	6.7897	363	131769	47832147	19.0526	7.1335
314	98596	30959144	17.7200	6.7969	364	132496	48228544	19.0788	7.1400
315	99225	31255875	17.7482	6.8041	365	133225	48627125	19.1050	7.1466
316	99856	31554496	17.7764	6.8113	366	133956	49027896	19.1311	7.1531
317	100489	31855013	17.8045	6.8185	367	134689	49430863	19.1572	7.1596
318	101124	32157432	17.8326	6.8256	368	135424	49836032	19.1833	7.1661
319	101761	32461759	17.8606	6.8328	369	136161	50243409	19.2094	7.1726
320	102400	32768000	17.8885	6.8399	370	136900	50653000	19.2354	7.1791
321	103041	33076161	17.9165	6.8470	371	137641	51064811	19.2614	7.1855
322	103684	33386244	17.9444	6.8541	372	138384	51478848	19.2873	7.1920
323	104329	33698267	17.9722	6.8612	373	139129	51895117	19.3132	7.1984
324	104976	34012224	18.0000	6.8683	374	139876	52313624	19.3391	7.2048
325	105625	34328125	18.0278	6.8753	375	140625	52734375	19.3649	7.2112
326	106276	34645976	18.0555	6.8824	376	141376	53157376	19.3907	7.2177
327	106929	34965783	18.0831	6.8894	377	142129	53582633	19.4165	7.2240
328	107584	35287552	18.1108	6.8964	378	142884	54010152	19.4422	7.2304
329	108241	35611289	18.1384	6.9034	379	143641	54439339	19.4679	7.2368
330	108900	35937000	18.1659	6.9104	380	144400	54872000	19.4936	7.2432
331	109561	36264691	18.1934	6.9174	381	145161	55306341	19.5192	7.2495
332	110224	36594368	18.2209	6.9244	382	145924	55742688	19.5448	7.2558
333	110889	36926037	18.2483	6.9313	383	146689	56181887	19.5704	7.2622
334	111556	37259704	18.2757	6.9382	384	147456	56623104	19.5959	7.2685
335	112225	37595375	18.3030	6.9451	385	148225	57066625	19.6214	7.2748
336	112896	37933056	18.3303	6.9521	386	148996	57512456	19.6469	7.2811
337	113569	38272753	18.3576	6.9589	387	149769	57960603	19.6723	7.2874
338	114244	38614472	18.3848	6.9658	388	150544	58411072	19.6977	7.2936
339	114921	38958219	18.4120	6.9727	389	151321	58863869	19.7231	7.2999
340	115600	39304000	18.4391	6.9795	390	152100	59319000	19.7484	7.3061
341	116281	39651821	18.4662	6.9864	391	152881	59776471	19.7737	7.3124
342	116964	40001688	18.4932	6.9932	392	153664	60236288	19.7990	7.3186
343	117649	40353607	18.5203	7.0000	393	154449	60698457	19.8242	7.3248
344	118336	40707584	18.5472	7.0068	394	155236	61162884	19.8494	7.3310
345	119025	41063625	18.5742	7.0136	395	156025	61629875	19.8746	7.3372
346	119716	41421736	18.6011	7.0203	396	156816	62099136	19.8997	7.3434
347	120409	41781923	18.6279	7.0271	397	157609	62570773	19.9249	7.3496
348	121104	42144192	18.6548	7.0338	398	158404	63044792	19.9499	7.3558
349	121801	42508549	18.6815	7.0406	399	159201	63521199	19.9750	7.3619

DORMAN, LONG, & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root ✓	Cube Root ✓	No.	Square	Cube	Square Root ✓	Cube Root ✓
400	160000	64000000	20.0000	7.3681	450	202500	91125000	21.2132	7.6631
401	160801	64481201	20.0250	7.3742	451	203401	91733851	21.2368	7.6688
402	161604	64964808	20.0499	7.3803	452	204304	92345408	21.2603	7.6744
403	162409	65450827	20.0749	7.3864	453	205209	92959677	21.2838	7.6801
404	163216	65938264	20.0999	7.3925	454	206116	93576664	21.3073	7.6857
405	164025	66430125	20.1246	7.3986	455	207025	94196375	21.3307	7.6914
406	164836	66923416	20.1494	7.4047	456	207936	94818816	21.3542	7.6970
407	165649	67419143	20.1742	7.4108	457	208849	95443393	21.3776	7.7026
408	166464	67917312	20.1990	7.4169	458	209764	96071912	21.4009	7.7082
409	167281	68417929	20.2237	7.4229	459	210681	96702579	21.4243	7.7138
410	168100	68921000	20.2485	7.4290	460	211600	97336000	21.4476	7.7194
411	168921	69426551	20.2731	7.4350	461	212521	97972181	21.4709	7.7250
412	169744	69934528	20.2978	7.4410	462	213444	98611128	21.4942	7.7306
413	170569	70444937	20.3224	7.4470	463	214369	99252947	21.5174	7.7362
414	171396	70957944	20.3470	7.4530	464	215296	99897344	21.5407	7.7418
415	172225	71473375	20.3715	7.4590	465	216225	100544625	21.5639	7.7473
416	173056	71991236	20.3961	7.4650	466	217156	101146966	21.5870	7.7529
417	173889	72511713	20.4206	7.4710	467	218089	101847563	21.6102	7.7584
418	174724	73034632	20.4450	7.4770	468	219024	102503232	21.6333	7.7639
419	175561	73560059	20.4695	7.4829	469	219961	103161709	21.6564	7.7695
420	176400	74088000	20.4939	7.4888	470	220900	103822000	21.6795	7.7750
421	177241	74618461	20.5183	7.4948	471	221841	104487111	21.7025	7.7805
422	178084	75151448	20.5426	7.5007	472	222784	105154048	21.7256	7.7860
423	178929	75686967	20.5670	7.5067	473	223729	105823817	21.7486	7.7915
424	179776	76225024	20.5913	7.5126	474	224676	106496424	21.7715	7.7970
425	180625	76765625	20.6155	7.5185	475	225625	107171875	21.7945	7.8025
426	181476	77308776	20.6398	7.5244	476	226576	107850176	21.8174	7.8079
427	182329	77854483	20.6640	7.5302	477	227529	108531333	21.8403	7.8134
428	183184	78402752	20.6882	7.5361	478	228484	109215352	21.8632	7.8188
429	184041	78953569	20.7123	7.5420	479	229441	109902239	21.8861	7.8243
430	184900	79507000	20.7364	7.5478	480	230400	110592000	21.9089	7.8297
431	185761	80062891	20.7605	7.5537	481	231361	111284641	21.9317	7.8352
432	186624	80621568	20.7846	7.5595	482	232324	111980168	21.9545	7.8406
433	187489	81182737	20.8087	7.5654	483	233289	112678587	21.9773	7.8460
434	188356	81746504	20.8327	7.5712	484	234256	113379904	22.0000	7.8514
435	189225	82312875	20.8567	7.5771	485	235225	114084125	22.0227	7.8568
436	190096	82882856	20.8806	7.5829	486	236196	114791256	22.0454	7.8622
437	190969	83455453	20.9045	7.5886	487	237169	115501303	22.0681	7.8676
438	191844	84027672	20.9284	7.5944	488	238144	116214272	22.0907	7.8730
439	192721	84604519	20.9523	7.6001	489	239121	116930169	22.1133	7.8784
440	193600	85184000	20.9762	7.6059	490	240100	117649000	22.1359	7.8837
441	194481	85766121	21.0000	7.6117	491	241081	118370771	22.1585	7.8891
442	195364	86350898	21.0238	7.6174	492	242064	119095488	22.1811	7.8944
443	196249	86938307	21.0476	7.6232	493	243049	119823157	22.2036	7.8998
444	197136	87528394	21.0713	7.6289	494	244036	120553784	22.2261	7.9051
445	198025	88121125	21.0950	7.6346	495	245025	121287375	22.2486	7.9105
446	198916	88716536	21.1187	7.6403	496	246016	122023936	22.2711	7.9158
447	199809	89314623	21.1424	7.6460	497	247009	122763473	22.2935	7.9211
448	200704	89915392	21.1660	7.6517	498	248004	123505992	22.3159	7.9264
449	201601	90518849	21.1896	7.6574	499	249001	124251489	22.3383	7.9317

DORMAN, LONG, & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1, TO 1,000.

No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$	No.	Square	Cube	Square Root $\sqrt{}$	Cube Root $\sqrt[3]{}$
500	250000	125000000	22-3607	7-9370	550	302500	166375000	23-4521	8-1932
501	251001	125751501	22-3830	7-9423	551	303601	167284151	23-4734	8-1982
502	252004	126506008	22-4054	7-9476	552	304704	168196408	23-4947	8-2031
503	253009	127263527	22-4277	7-9528	553	305809	169112377	23-5160	8-2081
504	254016	128024064	22-4499	7-9581	554	306916	170031494	23-5372	8-2130
505	255025	128787625	22-4722	7-9634	555	308025	170953875	23-5584	8-2180
506	256036	129554216	22-4944	7-9686	556	309136	171879616	23-5797	8-2229
507	257049	130323843	22-5167	7-9739	557	310249	172808793	23-6008	8-2278
508	258064	131096512	22-5389	7-9791	558	311364	173741112	23-6220	8-2327
509	259081	131872229	22-5610	7-9843	559	312481	174666799	23-6432	8-2377
510	260100	132651000	22-5832	7-9896	560	313600	175616000	23-6643	8-2426
511	261121	133432851	22-6053	7-9948	561	314721	176559481	23-6854	8-2475
512	262144	134217728	22-6274	8-0000	562	315844	177504528	23-7065	8-2524
513	263169	135005637	22-6495	8-0052	563	316969	178453547	23-7276	8-2573
514	264196	135796744	22-6716	8-0104	564	318096	179406144	23-7487	8-2621
515	265225	136590875	22-6936	8-0156	565	319225	180362125	23-7697	8-2670
516	266256	137388036	22-7156	8-0208	566	320356	181321496	23-7908	8-2719
517	267289	138188413	22-7376	8-0260	567	321489	182284263	23-8118	8-2768
518	268324	138991832	22-7596	8-0311	568	322624	183250432	23-8328	8-2816
519	269361	139798359	22-7816	8-0363	569	323761	184220009	23-8537	8-2865
520	270400	140608000	22-8035	8-0415	570	324900	185193000	23-8747	8-2913
521	271441	141420761	22-8254	8-0466	571	326041	186169411	23-8956	8-2962
522	272484	142236648	22-8472	8-0517	572	327184	187149248	23-9165	8-3010
523	273529	143055667	22-8692	8-0569	573	328329	188132517	23-9374	8-3059
524	274576	143877824	22-8910	8-0620	574	329476	189119224	23-9583	8-3107
525	275625	144703125	22-9129	8-0671	575	330625	190109375	23-9792	8-3155
526	276676	145531576	22-9347	8-0723	576	331776	191102936	24-0000	8-3203
527	277729	146363193	22-9565	8-0774	577	332929	192100033	24-0208	8-3251
528	278784	147197952	22-9783	8-0825	578	334084	193100552	24-0416	8-3300
529	279841	148035889	23-0000	8-0876	579	335241	194104639	24-0624	8-3348
530	280900	148877000	23-0217	8-0927	580	336400	195112200	24-0832	8-3396
531	281961	149721291	23-0434	8-0978	581	337561	196124911	24-1039	8-3443
532	283024	150568768	23-0651	8-1028	582	338724	197137368	24-1247	8-3491
533	284089	151419437	23-0868	8-1079	583	339889	198155287	24-1454	8-3539
534	285156	152273304	23-1084	8-1130	584	341056	199176704	24-1661	8-3587
535	286225	153130375	23-1301	8-1180	585	342225	2002001625	24-1868	8-3634
536	287296	153990656	23-1517	8-1231	586	343396	201230058	24-2074	8-3682
537	288369	154854153	23-1733	8-1281	587	344569	202262603	24-2281	8-3730
538	289444	155720872	23-1948	8-1332	588	345744	203297472	24-2487	8-3777
539	290521	156590819	23-2164	8-1382	589	346921	204336469	24-2693	8-3825
540	291600	157464000	23-2379	8-1433	590	348100	205379000	24-2899	8-3872
541	292681	158340421	23-2594	8-1483	591	349281	206425071	24-3105	8-3919
542	293764	159220088	23-2809	8-1533	592	350464	207474688	24-3311	8-3967
543	294849	160103007	23-3024	8-1583	593	351649	208527857	24-3516	8-4014
544	295936	160989184	23-3238	8-1633	594	352836	209584584	24-3721	8-4061
545	297025	161878629	23-3452	8-1683	595	354025	210644875	24-3926	8-4108
546	298116	162771356	23-3666	8-1733	596	355216	211708736	24-4131	8-4155
547	299209	163667323	23-3880	8-1783	597	356409	212776173	24-4336	8-4202
548	300304	164566592	23-4094	8-1833	598	357604	213847192	24-4540	8-4249
549	301401	165469149	23-4307	8-1882	599	358801	214921799	24-4745	8-4296

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root
600	360000	216000000	24.4949	8.4343	650	422500	274525000	25.4951	8.6624
601	361201	217011801	24.5153	8.4360	651	423601	275539451	25.5147	8.6668
602	362404	218167208	24.5357	8.4437	652	424804	277167808	25.5343	8.6713
603	363609	219266227	24.5561	8.4494	653	426009	278445077	25.5539	8.6757
604	364816	220348364	24.5764	8.4530	654	427216	279726264	25.5734	8.6801
605	366025	221445125	24.5967	8.4577	655	428425	281011375	25.5930	8.6845
606	367236	222545016	24.6171	8.4623	656	429636	282300416	25.6125	8.6890
607	368449	223648543	24.6374	8.4670	657	430849	283593393	25.6320	8.6934
608	369664	224755712	24.6577	8.4716	658	432064	284890312	25.6515	8.6978
609	370881	225866529	24.6779	8.4763	659	434281	286191179	25.6711	8.7022
610	372100	226981000	24.6982	8.4809	660	435500	287496000	25.6905	8.7066
611	373321	228099131	24.7184	8.4856	661	436721	288804781	25.7099	8.7110
612	374544	229220528	24.7386	8.4902	662	437944	290117528	25.7294	8.7154
613	375769	230346397	24.7588	8.4948	663	439169	291434241	25.7488	8.7198
614	376996	231475544	24.7790	8.4994	664	440396	292754944	25.7682	8.7241
615	378225	232608375	24.7992	8.5040	665	441625	294079625	25.7876	8.7285
616	379456	233744896	24.8193	8.5086	666	442856	295408286	25.8070	8.7329
617	380689	234885113	24.8395	8.5132	667	444089	296740963	25.8263	8.7373
618	381924	236029032	24.8596	8.5178	668	445324	298077632	25.8457	8.7416
619	383161	237176659	24.8797	8.5224	669	447561	299418309	25.8650	8.7460
620	384400	238328000	24.8998	8.5270	670	448800	300763000	25.8844	8.7503
621	385641	239483061	24.9199	8.5316	671	450041	302111711	25.9037	8.7547
622	386884	240641992	24.9399	8.5362	672	451284	303464448	25.9230	8.7590
623	388129	241804367	24.9600	8.5408	673	452529	304821217	25.9422	8.7634
624	389376	242970624	24.9800	8.5453	674	453776	306182024	25.9615	8.7677
625	390625	244140625	25.0000	8.5499	675	455025	307546875	25.9808	8.7721
626	391876	245314376	25.0200	8.5544	676	456276	308915776	25.0000	8.7764
627	393129	246492883	25.0400	8.5590	677	457529	310288733	26.0192	8.7807
628	394384	247676152	25.0599	8.5635	678	458784	311665752	26.0384	8.7850
629	395641	248865189	25.0799	8.5681	679	461041	313046839	26.0576	8.7893
630	396900	250047000	25.0998	8.5726	680	462400	314432000	26.0768	8.7937
631	398161	251233691	25.1197	8.5772	681	463761	315821241	26.0960	8.7980
632	399424	252425568	25.1396	8.5817	682	465124	317214568	26.1151	8.8023
633	400689	253621375	25.1595	8.5862	683	466489	318611987	26.1343	8.8066
634	401956	254821104	25.1794	8.5907	684	467856	320013504	26.1534	8.8109
635	403225	256024785	25.1992	8.5952	685	469225	321419125	26.1725	8.8152
636	404496	257232496	25.2190	8.5997	686	470596	322828856	26.1916	8.8194
637	405769	258444853	25.2389	8.6043	687	471969	324242703	26.2107	8.8237
638	407044	259660772	25.2587	8.6088	688	473344	325660672	26.2298	8.8280
639	408321	260881119	25.2784	8.6132	689	474721	327082769	26.2488	8.8323
640	409600	262104400	25.2982	8.6177	690	476100	328509000	26.2679	8.8366
641	410881	263337721	25.3180	8.6222	691	477481	329939371	26.2869	8.8408
642	412164	264570288	25.3377	8.6267	692	478864	331373888	26.3059	8.8451
643	413449	265807707	25.3574	8.6312	693	480249	332812557	26.3249	8.8493
644	414736	267049896	25.3772	8.6357	694	481636	334255384	26.3439	8.8536
645	416025	268296125	25.3969	8.6401	695	483025	335702375	26.3629	8.8578
646	417316	269546516	25.4165	8.6446	696	484416	337153536	26.3818	8.8621
647	418609	270800023	25.4362	8.6490	697	485809	338608873	26.4008	8.8663
648	419904	272057792	25.4558	8.6535	698	487204	340068392	26.4197	8.8706
649	421201	273359449	25.4755	8.6579	699	488601	341532099	26.4386	8.8748

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root ✓	Cube Root ✓	No.	Square	Cube	Square Root ✓	Cube Root ✓
700	490000	343000000	26.4575	8.8790	750	562500	421875000	27.3861	9.0856
701	491401	344472101	26.4764	8.8833	751	564001	423564751	27.4044	9.0896
702	492804	345948808	26.4953	8.8875	752	565504	425259008	27.4226	9.0937
703	494209	347428927	26.5141	8.8917	753	567009	426957777	27.4408	9.0977
704	495616	348913664	26.5330	8.8959	754	568516	428651064	27.4591	9.1017
705	497025	350402625	26.5518	8.9001	755	570025	430348875	27.4773	9.1057
706	498436	351895816	26.5707	8.9043	756	571536	4320401216	27.4955	9.1098
707	499849	353393243	26.5895	8.9085	757	573049	4337398093	27.5136	9.1138
708	501264	354894912	26.6083	8.9127	758	574564	43543519512	27.5318	9.1178
709	502681	356400829	26.6271	8.9169	759	576081	4371245479	27.5500	9.1218
710	504100	357911000	26.6458	8.9211	760	577600	4388176000	27.5681	9.1258
711	505521	359426531	26.6646	8.9253	761	579121	4405141081	27.5862	9.1298
712	506944	360944128	26.6833	8.9295	762	580644	4422145772	27.6043	9.1338
713	508369	362463797	26.7021	8.9337	763	582169	4439189947	27.6225	9.1378
714	509796	363985444	26.7208	8.9378	764	583696	4456273744	27.6405	9.1418
715	511225	365508585	26.7395	8.9420	765	585225	4473397125	27.6586	9.1458
716	512656	367033166	26.7582	8.9462	766	586756	4490555096	27.6767	9.1498
717	514089	368559183	26.7769	8.9503	767	588289	4507747663	27.6948	9.1537
718	515524	370086624	26.7955	8.9545	768	589824	4524984832	27.7128	9.1577
719	516961	371615489	26.8142	8.9587	769	591361	4542266609	27.7308	9.1617
720	518400	373145700	26.8328	8.9628	770	592900	4559593300	27.7489	9.1657
721	519841	374677351	26.8514	8.9670	771	594441	4576964411	27.7669	9.1696
722	521284	376210448	26.8701	8.9711	772	595984	4594379948	27.7849	9.1736
723	522729	377745007	26.8887	8.9752	773	597529	4611839977	27.8028	9.1775
724	524176	379281024	26.9072	8.9794	774	599076	4629344424	27.8209	9.1815
725	525625	380818505	26.9258	8.9835	775	600625	4646893375	27.8388	9.1855
726	527076	382357456	26.9444	8.9876	776	602176	4664486816	27.8568	9.1894
727	528529	383897883	26.9629	8.9918	777	603729	4682124843	27.8747	9.1933
728	529984	385439800	26.9815	8.9959	778	605284	4700007376	27.8927	9.1973
729	531441	386983219	27.0000	9.0000	779	606841	4717934409	27.9106	9.2012
730	532900	388528100	27.0185	9.0041	780	608400	4735915900	27.9285	9.2052
731	534361	390074451	27.0370	9.0082	781	609961	4753951951	27.9464	9.2091
732	535824	391622268	27.0555	9.0123	782	611524	4772042468	27.9643	9.2130
733	537289	393171557	27.0740	9.0164	783	613089	4790187547	27.9821	9.2170
734	538756	394722324	27.0924	9.0205	784	614656	4808387184	28.0000	9.2209
735	540225	396274575	27.1109	9.0246	785	616225	4826641385	28.0179	9.2248
736	541696	397828326	27.1293	9.0287	786	617796	4844950144	28.0357	9.2287
737	543169	400383553	27.1477	9.0328	787	619369	4863314463	28.0535	9.2326
738	544644	401940272	27.1662	9.0369	788	620944	4881734352	28.0713	9.2365
739	546121	403508519	27.1846	9.0410	789	622521	4900209809	28.0891	9.2404
740	547600	405078200	27.2029	9.0450	790	624100	4918740300	28.1069	9.2443
741	549081	406649321	27.2213	9.0491	791	625681	4937325361	28.1247	9.2482
742	550564	408221888	27.2397	9.0532	792	627264	4955965984	28.1425	9.2521
743	552049	410795927	27.2580	9.0572	793	628849	4974672257	28.1603	9.2560
744	553536	411830784	27.2764	9.0613	794	630436	5003355184	28.1780	9.2599
745	555025	413493625	27.2947	9.0654	795	632025	5022035985	28.1957	9.2638
746	556516	415160936	27.3130	9.0694	796	633616	5040724336	28.2135	9.2677
747	558009	416832723	27.3313	9.0735	797	635209	5059420347	28.2312	9.2716
748	559504	418508992	27.3496	9.0775	798	636804	5078124016	28.2489	9.2754
749	561001	420189749	27.3679	9.0816	799	638401	5100082399	28.2666	9.2793

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root ✓	Cube Root ✓	No.	Square	Cube	Square Root ✓	Cube Root ✓
800	640000	512000000	28 2843	9 2832	850	722500	614125000	29 1548	9 4727
801	641601	513922401	28 3019	9 2870	851	724201	616285051	29 1719	9 4764
802	643204	515845608	28 3196	9 2909	852	725904	618471208	29 1890	9 4801
803	644809	517768627	28 3373	9 2948	853	727609	620653477	29 2062	9 4838
804	646416	519718464	28 3549	9 2986	854	729316	622835354	29 2233	9 4875
805	648025	521660125	28 3725	9 3025	855	731025	625026375	29 2404	9 4912
806	649636	523609616	28 3901	9 3063	856	732736	627222016	29 2575	9 4949
807	651249	525567943	28 4077	9 3102	857	734449	629422793	29 2746	9 4986
808	652864	527541112	28 4253	9 3140	858	736164	631623712	29 2917	9 5023
809	654481	5294975125	28 4429	9 3179	859	737881	633839779	29 3087	9 5060
810	656100	531441000	28 4605	9 3217	860	739500	636059000	29 3258	9 5097
811	657721	533411731	28 4781	9 3255	861	741321	638277331	29 3428	9 5134
812	659344	535337328	28 4956	9 3294	862	743044	640503392	29 3598	9 5171
813	660969	537377797	28 5132	9 3332	863	744769	642735647	29 3769	9 5207
814	662596	539353144	28 5307	9 3370	864	746496	644972644	29 3939	9 5244
815	664225	541443375	28 5482	9 3408	865	748225	647214625	29 4109	9 5281
816	665856	543533496	28 5657	9 3447	866	749956	649461896	29 4279	9 5317
817	667489	545633813	28 5832	9 3485	867	751689	651713433	29 4449	9 5354
818	669124	547743343	28 6007	9 3523	868	753424	653972032	29 4618	9 5391
819	670761	549853359	28 6182	9 3561	869	755161	656234903	29 4788	9 5427
820	672400	551963000	28 6356	9 3599	870	756900	658503000	29 4958	9 5464
821	674041	554073761	28 6531	9 3637	871	758641	660777311	29 5127	9 5501
822	675684	556184224	28 6706	9 3675	872	760384	663064848	29 5296	9 5537
823	677329	558294767	28 6880	9 3713	873	762129	665353817	29 5466	9 5574
824	678976	560405296	28 7054	9 3751	874	763876	667643624	29 5635	9 5610
825	680625	562515825	28 7228	9 3789	875	765625	669934175	29 5804	9 5647
826	682276	564626356	28 7402	9 3827	876	767376	672224376	29 5973	9 5683
827	683929	566736889	28 7576	9 3865	877	769129	674514625	29 6142	9 5719
828	685584	568847424	28 7750	9 3902	878	770884	676805152	29 6311	9 5756
829	687241	569957971	28 7924	9 3940	879	772641	679115439	29 6479	9 5792
830	688900	571787000	28 8097	9 3978	880	774400	681472000	29 6648	9 5828
831	690561	573956191	28 8271	9 4016	881	776161	683797841	29 6816	9 5865
832	692224	576125368	28 8444	9 4053	882	777924	686128968	29 6985	9 5901
833	693889	578294537	28 8617	9 4091	883	779689	688465337	29 7153	9 5937
834	695556	580463704	28 8791	9 4129	884	781456	690807104	29 7321	9 5973
835	697225	582632875	28 8964	9 4166	885	783225	693154125	29 7489	9 6010
836	698896	584802056	28 9137	9 4204	886	784996	695506456	29 7658	9 6046
837	700569	586971239	28 9310	9 4241	887	786769	697864103	29 7825	9 6082
838	702244	589140472	28 9482	9 4279	888	788544	700227072	29 7993	9 6118
839	703921	590309719	28 9655	9 4316	889	790321	702595369	29 8161	9 6154
840	705600	592479000	28 9828	9 4354	890	792100	704969000	29 8329	9 6190
841	707281	594648281	29 0000	9 4391	891	793881	707347971	29 8496	9 6226
842	708964	596817568	29 0172	9 4429	892	795664	709732288	29 8664	9 6262
843	710649	598986857	29 0345	9 4466	893	797449	712121957	29 8831	9 6298
844	712336	601156144	29 0517	9 4503	894	799236	714516984	29 8998	9 6334
845	714025	603325433	29 0689	9 4541	895	801025	716917375	29 9166	9 6370
846	715716	605494726	29 0861	9 4578	896	802816	719323136	29 9333	9 6406
847	717409	607664023	29 1033	9 4615	897	804609	721734273	29 9500	9 6442
848	719104	609833320	29 1204	9 4652	898	806404	724150792	29 9666	9 6477
849	720801	611960099	29 1376	9 4690	899	808201	726572699	29 9833	9 6513

DORMAN, LONG & CO. LIMITED.

SQUARES, CUBES, SQUARE ROOTS,
CUBE ROOTS, NOS. FROM 1 TO 1,000.

No.	Square	Cube	Square Root ✓	Cube Root ✓	No.	Square	Cube	Square Root ✓	Cube Root ✓
900	810070	729000000	30.0000	9.6549	950	902500	857375000	30.8221	9.8305
901	811801	731432701	30.0167	9.6588	951	904401	860085351	30.8383	9.8339
902	813604	733870808	30.0333	9.6620	952	906304	862801408	30.8545	9.8374
903	815409	736314327	30.0500	9.6656	953	908209	865523177	30.8707	9.8408
904	817216	738763264	30.0666	9.6692	954	910116	868250664	30.8869	9.8443
905	819025	741217625	30.0832	9.6727	955	912025	870983875	30.9031	9.8477
906	820836	743677316	30.0998	9.6763	956	913936	873722816	30.9192	9.8511
907	822649	746142643	30.1164	9.6799	957	915849	876457493	30.9354	9.8546
908	824454	748613312	30.1330	9.6834	958	917764	879212912	30.9516	9.8580
909	826281	751089429	30.1496	9.6870	959	919681	881974079	30.9677	9.8614
910	828100	753571000	30.1662	9.6905	960	921600	884736000	30.9839	9.8648
911	829921	756059051	30.1828	9.6941	961	923521	887503661	31.0000	9.8683
912	831744	758553520	30.1993	9.6976	962	925444	890277128	31.0161	9.8717
913	833569	761048497	30.2159	9.7012	963	927369	893056347	31.0322	9.8751
914	835396	763551944	30.2324	9.7047	964	929296	895841344	31.0483	9.8785
915	837225	766060375	30.2489	9.7082	965	931225	898632125	31.0644	9.8819
916	839056	768575296	30.2655	9.7118	966	933156	901428696	31.0805	9.8854
917	840889	771095213	30.2820	9.7153	967	935089	904231063	31.0966	9.8888
918	842724	773620632	30.2985	9.7188	968	937024	907039732	31.1127	9.8922
919	844561	776151559	30.3150	9.7224	969	938961	909853209	31.1288	9.8956
920	846400	778682000	30.3315	9.7259	970	940900	912673000	31.1448	9.8990
921	848241	781222961	30.3480	9.7294	971	942841	915493511	31.1609	9.9024
922	850084	783774448	30.3645	9.7329	972	944784	918330048	31.1769	9.9058
923	851929	786330467	30.3809	9.7364	973	946729	921167313	31.1929	9.9092
924	853776	788888924	30.3974	9.7400	974	948676	924010424	31.2090	9.9126
925	855625	791453125	30.4138	9.7435	975	950625	926859375	31.2250	9.9160
926	857476	794022776	30.4302	9.7470	976	952576	929714176	31.2410	9.9194
927	859329	796597983	30.4467	9.7505	977	954529	932574833	31.2570	9.9227
928	861184	799178752	30.4631	9.7540	978	956484	935441392	31.2730	9.9261
929	863041	801765069	30.4795	9.7575	979	958441	938313739	31.2890	9.9295
930	864900	804357000	30.4959	9.7610	980	960400	941192000	31.3050	9.9329
931	866761	806954491	30.5123	9.7645	981	962361	944076141	31.3209	9.9363
932	868624	809557568	30.5287	9.7680	982	964324	946966168	31.3369	9.9396
933	870489	812166237	30.5450	9.7715	983	966289	949862037	31.3528	9.9430
934	872356	814780504	30.5614	9.7750	984	968256	952765904	31.3688	9.9464
935	874225	817400375	30.5778	9.7785	985	970225	955671625	31.3847	9.9497
936	876096	820025856	30.5941	9.7819	986	972196	958585256	31.4006	9.9531
937	877969	822656953	30.6105	9.7854	987	974169	961504803	31.4166	9.9565
938	879844	825283672	30.6268	9.7889	988	976144	964430272	31.4325	9.9598
939	881721	827936019	30.6431	9.7924	989	978121	967361669	31.4484	9.9632
940	883600	830584000	30.6594	9.7959	990	980100	970299000	31.4643	9.9666
941	885481	833237621	30.6757	9.7993	991	982081	973242271	31.4802	9.9699
942	887364	835896888	30.6920	9.8028	992	984064	976191488	31.4960	9.9733
943	889249	838561807	30.7083	9.8063	993	986049	979146657	31.5119	9.9766
944	891136	841232384	30.7246	9.8097	994	988036	982107784	31.5278	9.9800
945	893025	843908625	30.7409	9.8132	995	990025	985074875	31.5436	9.9833
946	894916	846590356	30.7571	9.8167	996	992016	988047936	31.5595	9.9866
947	896809	849278123	30.7734	9.8201	997	994009	991026973	31.5753	9.9900
948	898704	851971392	30.7896	9.8236	998	996004	994011992	31.5911	9.9933
949	900601	854670349	30.8058	9.8270	999	998001	997002999	31.6070	9.9967

DORMAN, LONG & CO. LIMITED.

LOGARITHMS OF NUMBERS FROM 0 TO 1,000.

No.	0	1	2	3	4	5	6	7	8	9
0	0	0000	30103	47712	60206	69897	77815	84510	90309	95424
10	00000	00432	00860	01284	01703	02119	02531	02938	03342	03743
11	04139	04532	04922	05308	05690	06070	06446	06819	07188	07555
12	07918	08279	08636	08991	09342	09691	10037	10380	10721	11059
13	11394	11727	12057	12385	12710	13033	13354	13672	13988	14301
14	14613	14922	15229	15534	15836	16137	16435	16732	17026	17319
15	17609	17898	18184	18469	18752	19033	19312	19590	19866	20140
16	20412	20683	20951	21219	21484	21748	22011	22272	22531	22789
17	23045	23300	23553	23805	24055	24304	24551	24797	25042	25285
18	25527	25768	26007	26245	26482	26717	26951	27184	27416	27646
19	27875	28103	28330	28556	28780	29003	29226	29447	29667	29885
20	30103	30320	30535	30750	30963	31175	31387	31597	31806	32015
21	32222	32428	32634	32838	33041	33244	33445	33646	33846	34044
22	34242	34439	34635	34830	35025	35218	35411	35603	35793	35984
23	36173	36361	36549	36736	36922	37107	37291	37475	37658	37840
24	38021	38202	38382	38561	38739	38917	39094	39270	39445	39620
25	39794	39967	40140	40312	40483	40654	40824	40993	41162	41330
26	41497	41664	41830	41996	42160	42325	42488	42651	42813	42975
27	43136	43297	43457	43616	43775	43933	44091	44248	44404	44560
28	44716	44871	45025	45179	45332	45484	45637	45788	45939	46090
29	46240	46389	46538	46687	46835	46982	47129	47276	47422	47567
30	47712	47857	48001	48144	48287	48430	48572	48714	48855	48996
31	49136	49276	49415	49554	49693	49831	49969	50106	50243	50379
32	50515	50650	50786	50920	51054	51188	51322	51455	51587	51720
33	51851	51983	52114	52244	52375	52504	52634	52763	52892	53020
34	53148	53275	53403	53529	53656	53782	53908	54033	54158	54283
35	54407	54531	54654	54777	54900	55023	55145	55267	55388	55509
36	55630	55751	55871	55991	56110	56229	56348	56467	56585	56703
37	56820	56937	57054	57171	57287	57403	57519	57634	57749	57864
38	57978	58092	58206	58320	58435	58549	58663	58777	58891	58995
39	59106	59218	59329	59439	59550	59660	59770	59879	59988	60097
40	60206	60314	60423	60530	60638	60745	60853	60959	61066	61172
41	61278	61384	61490	61595	61700	61805	61909	62014	62118	62221
42	62325	62428	62531	62634	62737	62839	62941	63043	63144	63246
43	63347	63448	63543	63649	63749	63849	63949	64048	64147	64246
44	64345	64444	64542	64640	64738	64836	64933	65031	65128	65225
45	65321	65418	65514	65610	65706	65801	65896	65992	66087	66181
46	66276	66370	66464	66558	66652	66745	66839	66932	67025	67117
47	67210	67302	67394	67486	67578	67669	67761	67852	67943	68034
48	68124	68215	68305	68396	68485	68574	68664	68753	68842	68931
49	69020	69108	69197	69285	69373	69461	69548	69636	69723	69810
50	69897	69984	70070	70157	70243	70329	70415	70501	70586	70672
51	70757	70842	70927	71012	71097	71181	71265	71349	71433	71517
52	71600	71684	71767	71850	71933	72016	72099	72181	72263	72346
53	72428	72509	72591	72673	72754	72835	72916	72997	73078	73159
54	73239	73320	73400	73480	73560	73640	73719	73799	73878	73957

DORMAN, LONG & CO. LIMITED.

LOGARITHMS OF NUMBERS FROM 0 TO 1,000.

No.	0	1	2	3	4	5	6	7	8	9
55	74036	74115	74194	74273	74351	74429	74507	74586	74663	74741
56	74819	74896	74974	75051	75128	75205	75282	75358	75435	75511
57	75587	75664	75740	75815	75891	75967	76042	76118	76193	76268
58	76343	76418	76492	76567	76641	76716	76790	76864	76938	77012
59	77085	77159	77232	77305	77379	77452	77525	77597	77670	77743
60	77815	77887	77960	78032	78104	78176	78247	78319	78390	78462
61	78533	78604	78675	78746	78817	78888	78958	79029	79099	79169
62	79239	79309	79379	79449	79518	79588	79657	79727	79796	79865
63	79934	80003	80072	80140	80209	80277	80346	80414	80482	80550
64	80618	80686	80753	80821	80889	80956	81023	81090	81157	81224
65	81291	81358	81425	81491	81558	81624	81690	81757	81823	81889
66	81954	82020	82086	82151	82217	82282	82347	82413	82478	82543
67	82607	82672	82737	82802	82866	82930	82995	83059	83123	83187
68	83251	83315	83378	83442	83506	83569	83632	83696	83759	83822
69	83885	83948	84011	84073	84136	84198	84261	84323	84386	84448
70	84510	84572	84634	84696	84757	84819	84880	84942	85003	85065
71	85126	85187	85248	85309	85369	85431	85491	85552	85612	85673
72	85733	85794	85854	85914	85974	86034	86094	86153	86213	86273
73	86333	86392	86451	86510	86570	86629	86688	86747	86806	86864
74	86923	86982	87040	87099	87157	87216	87274	87332	87390	87448
75	87506	87564	87622	87679	87737	87795	87852	87910	87967	88024
76	88081	88138	88195	88252	88309	88366	88423	88480	88536	88593
77	88649	88705	88762	88819	88874	88930	88985	89042	89098	89154
78	89209	89265	89321	89376	89432	89487	89542	89597	89653	89708
79	89763	89818	89873	89927	89982	90037	90091	90146	90200	90255
80	90309	90363	90417	90472	90526	90580	90633	90687	90741	90795
81	90849	90902	90956	91009	91062	91116	91169	91222	91275	91328
82	91381	91434	91487	91540	91593	91645	91698	91751	91803	91855
83	91906	91959	92012	92064	92117	92169	92221	92273	92324	92376
84	92428	92480	92531	92583	92634	92686	92737	92788	92840	92891
85	92942	92993	93044	93095	93146	93197	93247	93298	93349	93399
86	93450	93500	93551	93601	93651	93702	93752	93802	93852	93902
87	93952	94002	94052	94101	94151	94201	94250	94300	94349	94399
88	94448	94498	94547	94596	94645	94694	94743	94792	94841	94890
89	94939	94988	95036	95085	95134	95182	95231	95279	95328	95376
90	95424	95472	95521	95569	95617	95665	95713	95761	95809	95856
91	95904	95952	96000	96047	96095	96142	96190	96237	96284	96332
92	96379	96426	96473	96520	96567	96614	96661	96708	96755	96802
93	96848	96895	96942	96989	97035	97081	97128	97174	97220	97267
94	97313	97359	97405	97451	97497	97543	97589	97635	97681	97727
95	97772	97818	97864	97909	97955	98000	98046	98091	98137	98182
96	98227	98272	98318	98363	98408	98453	98498	98543	98588	98632
97	98677	98722	98767	98811	98856	98900	98945	98989	99034	99078
98	99123	99167	99211	99255	99300	99344	99388	99432	99476	99520
99	99564	99607	99651	99695	99739	99782	99826	99870	99913	99957

DORMAN, LONG, & CO. LIMITED.

Degrees	SINE							Degrees
	0'	10'	20'	30'	40'	50'	60'	
0		00291	00582	00873	01164	01454	01745	89
1	01745	02036	02327	02618	02908	03199	03490	88
2	03490	03781	04071	04362	04653	04943	05234	87
3	05234	05524	05814	06105	06395	06685	06976	86
4	06976	07266	07556	07846	08136	08426	08716	85
5	08716	09005	09295	09585	09874	10164	10453	84
6	10453	10742	11031	11320	11609	11898	12187	83
7	12187	12476	12764	13053	13341	13629	13917	82
8	13917	14205	14493	14781	15069	15356	15643	81
9	15643	15931	16218	16505	16792	17079	17365	80
10	17365	17651	17937	18224	18509	18795	19081	79
11	19081	19366	19652	19937	20222	20507	20791	78
12	20791	21076	21360	21644	21928	22212	22495	77
13	22495	22778	23062	23345	23627	23910	24192	76
14	24192	24474	24756	25038	25320	25601	25882	75
15	25882	26163	26443	26724	27004	27284	27564	74
16	27564	27843	28123	28402	28680	28959	29237	73
17	29237	29515	29793	30071	30348	30625	30902	72
18	30902	31178	31454	31730	32006	32282	32557	71
19	32557	32832	33106	33381	33655	33929	34202	70
20	34202	34475	34748	35021	35293	35565	35837	69
21	35837	36108	36379	36650	36921	37191	37461	68
22	37461	37730	37999	38268	38537	38805	39073	67
23	39073	39341	39608	39875	40142	40408	40674	66
24	40674	40939	41204	41469	41734	41998	42262	65
25	42262	42525	42788	43051	43313	43575	43837	64
26	43837	44098	44359	44620	44880	45140	45399	63
27	45399	45658	45917	46175	46433	46690	46947	62
28	46947	47204	47460	47716	47971	48226	48481	61
29	48481	48735	48989	49242	49495	49748	50000	60
30	50000	50252	50503	50754	51004	51254	51504	59
31	51504	51753	52002	52250	52498	52745	52992	58
32	52992	53238	53484	53730	53975	54220	54464	57
33	54464	54708	54951	55194	55436	55678	55919	56
34	55919	56160	56401	56641	56880	57119	57358	55
35	57358	57596	57833	58070	58307	58543	58779	54
36	58779	59014	59248	59482	59716	59949	60182	53
37	60182	60414	60645	60875	61107	61337	61566	52
38	61566	61795	62024	62251	62479	62706	62932	51
39	62932	63160	63387	63613	63839	64065	64291	50
40	64291	64517	64742	64965	65188	65410	65631	49
41	65631	65855	66078	66299	66520	66740	66959	48
42	66959	67179	67398	67615	67832	68048	68263	47
43	68263	68479	68693	68906	69118	69329	69539	46
44	69539	69749	69958	70165	70372	70578	70783	45
	60'	50'	40'	30'	20'	10'	0'	

DORMAN, LONG & CO. LIMITED.

Degrees	SINE							Degrees
	0'	10'	20'	30'	40'	50'	60'	
0	1	1	99998	99996	99993	99989	99985	89
1	99985	99979	99973	99966	99958	99949	99939	88
2	99939	99929	99917	99905	99892	99878	99863	87
3	99863	99847	99831	99813	99795	99776	99755	86
4	99756	99736	99714	99692	99668	99644	99619	85
5	99619	99594	99567	99540	99511	99482	99452	84
6	99452	99421	99389	99357	99324	99290	99255	83
7	99255	99219	99182	99144	99106	99067	99027	82
8	99027	98986	98944	98902	98858	98814	98769	81
9	98769	98723	98676	98629	98580	98531	98481	80
10	98481	98430	98378	98325	98272	98218	98163	79
11	98163	98107	98050	97992	97934	97875	97815	78
12	97815	97754	97692	97630	97566	97502	97437	77
13	97437	97371	97304	97237	97169	97100	97030	76
14	97030	96959	96888	96815	96742	96667	96593	75
15	96593	96517	96440	96363	96285	96206	96126	74
16	96126	96046	95964	95882	95799	95715	95630	73
17	95630	95546	95459	95372	95284	95195	95106	72
18	95106	95015	94924	94832	94740	94646	94552	71
19	94552	94457	94361	94264	94167	94068	93969	70
20	93969	93869	93769	93667	93565	93462	93358	69
21	93358	93253	93148	93042	92935	92827	92718	68
22	92718	92609	92499	92388	92276	92164	92050	67
23	92050	91936	91822	91706	91590	91472	91355	66
24	91355	91236	91116	90996	90875	90753	90631	65
25	90631	90507	90383	90259	90133	90007	89879	64
26	89879	89752	89625	89495	89363	89232	89099	63
27	89099	88968	88835	88701	88566	88431	88295	62
28	88295	88153	88020	87882	87743	87603	87462	61
29	87462	87321	87178	87036	86892	86748	86603	60
30	86603	86457	86310	86163	86015	85866	85717	59
31	85717	85567	85416	85264	85112	84959	84806	58
32	84806	84650	84496	84339	84182	84025	83867	57
33	83867	83703	83549	83389	83228	83066	82904	56
34	82904	82741	82577	82413	82248	82082	81915	55
35	81915	81748	81579	81412	81242	81072	80902	54
36	80902	80730	80558	80386	80212	80038	79864	53
37	79864	79689	79512	79335	79158	78979	78799	52
38	78799	78622	78442	78261	78079	77897	77715	51
39	77715	77531	77347	77162	76977	76791	76604	50
40	76604	76417	76229	76041	75851	75661	75471	49
41	75471	75280	75088	74896	74703	74509	74314	48
42	74314	74120	73924	73728	73531	73333	73135	47
43	73135	72937	72737	72537	72337	72136	71934	46
44	71934	71732	71529	71325	71121	70916	70711	45
60	50	40	30	20	10	0		

SINE

DORMAN, LONG & CO. LIMITED.

Degrees	TANGENT							Degrees
	0'	10'	20'	30'	40'	50'	60'	
0		00291	00582	00873	01164	01465	01746	89
1	01746	02036	02328	02619	02910	03201	03492	88
2	03492	03783	04075	04366	04658	04949	05241	87
3	05241	05533	05824	06116	06408	06700	06993	86
4	06993	07285	07578	07870	08163	08456	08749	85
5	08749	09042	09335	09629	09923	10216	10510	84
6	10510	10805	11099	11394	11688	11983	12278	83
7	12278	12574	12869	13165	13461	13758	14054	82
8	14054	14351	14648	14945	15243	15540	15838	81
9	15838	16137	16435	16734	17033	17333	17633	80
10	17633	17933	18233	18534	18835	19136	19438	79
11	19438	19740	20042	20345	20648	20952	21256	78
12	21256	21560	21864	22168	22473	22778	23083	77
13	23083	23389	23700	24008	24316	24624	24933	76
14	24933	25242	25552	25862	26172	26483	26795	75
15	26795	27107	27419	27732	28046	28350	28675	74
16	28675	28990	29305	29621	29938	30255	30573	73
17	30573	30891	31210	31530	31850	32171	32492	72
18	32492	32814	33136	33460	33784	34109	34433	71
19	34433	34758	35085	35412	35740	36068	36397	70
20	36397	36727	37057	37388	37720	38053	38386	69
21	38386	38721	39055	39391	39727	40065	40403	68
22	40403	40741	41081	41421	41763	42105	42447	67
23	42447	42791	43136	43481	43828	44175	44523	66
24	44523	44872	45222	45573	45924	46277	46631	65
25	46631	46985	47341	47698	48055	48414	48773	64
26	48773	49134	49495	49858	50222	50587	50953	63
27	50953	51320	51688	52057	52427	52799	53171	62
28	53171	53545	53920	54296	54673	55051	55431	61
29	55431	55812	56194	56577	56962	57347	57735	60
30	57735	58124	58513	58905	59297	59691	60086	59
31	60086	60483	60881	61280	61681	62083	62487	58
32	62487	62892	63299	63707	64117	64528	64941	57
33	64941	65355	65771	66189	66608	67028	67451	56
34	67451	67875	68301	68728	69157	69588	70021	55
35	70021	70455	70891	71329	71769	72211	72654	54
36	72654	73100	73547	73996	74447	74900	75355	53
37	75355	75812	76272	76733	77196	77661	78129	52
38	78129	78598	79070	79544	80020	80498	80978	51
39	80978	81461	81946	82434	82923	83415	83910	50
40	83910	84407	84906	85408	85912	86419	86928	49
41	86928	87441	87955	88473	88992	89515	90040	48
42	90040	90569	91099	91633	92170	92709	93252	47
43	93252	93797	94345	94896	95451	96008	96569	46
44	96569	97133	97700	98270	98843	99420		45
	60'	50'	40'	30'	20'	10'	0'	

COTANGENT

DORMAN, LONG & CO. LIMITED.

Degrees	OBTANGENT							
	0'	10'	20'	30'	40'	50'	60'	
0		343.77371	171.88540	114.53865	65.93973	68.75009	57.28996	89
1	57.28996	49.10388	42.96402	38.18846	34.36777	31.24158	28.63625	88
2	28.63625	26.43160	24.54176	22.90377	21.47040	20.20555	19.08114	87
3	19.08114	13.07438	17.16934	16.34986	15.65472	14.92442	14.30067	86
4	14.30067	13.72674	13.19683	12.70621	12.25051	11.82617	11.43006	85
5	11.43005	11.05943	10.71197	10.38540	10.07803	9.77817	9.51436	84
6	9.51436	9.25530	9.00883	8.77639	8.55555	8.34446	8.14435	83
7	8.14435	7.95302	7.77035	7.59575	7.42871	7.26873	7.11537	82
8	7.11537	6.96323	6.82694	6.69116	6.56055	6.43484	6.31375	81
9	6.31375	6.19703	6.08444	5.97576	5.87080	5.76937	5.67128	80
10	5.67123	5.57638	5.48451	5.39552	5.30928	5.22566	5.14455	79
11	5.14455	5.06534	4.98840	4.91316	4.84000	4.77286	4.70466	78
12	4.70463	4.63225	4.56363	4.49771	4.43442	4.37369	4.31146	77
13	4.31148	4.24771	4.18734	4.13030	4.07566	4.02342	3.97177	76
14	4.01073	3.96165	3.91364	3.86671	3.82083	3.77595	3.73205	75
15	3.73205	3.68909	3.64703	3.60583	3.56557	3.52609	3.48741	74
16	3.48741	3.44951	3.41266	3.37694	3.34235	3.30881	3.27632	73
17	3.27632	3.23714	3.20006	3.17159	3.13972	3.10842	3.07768	72
18	3.07768	3.04749	3.01783	2.98869	2.96004	2.93189	2.90421	71
19	2.90421	2.87700	2.85023	2.82391	2.79802	2.77254	2.74748	70
20	2.74748	2.72211	2.69853	2.67452	2.65109	2.62791	2.60509	69
21	2.60509	2.58261	2.56096	2.53965	2.51715	2.49537	2.47509	68
22	2.47509	2.45401	2.43422	2.41421	2.39449	2.37504	2.35585	67
23	2.35585	2.33633	2.31726	2.29854	2.28016	2.26204	2.24404	66
24	2.24604	2.22857	2.21162	2.19430	2.17749	2.16090	2.14451	65
25	2.14451	2.12832	2.11233	2.09654	2.08094	2.06553	2.05030	64
26	2.05030	2.03526	2.02039	2.00569	1.99116	1.97680	1.96261	63
27	1.96261	1.94853	1.93470	1.92093	1.90741	1.89400	1.88073	62
28	1.88073	1.86760	1.85462	1.84177	1.82906	1.81649	1.80405	61
29	1.80405	1.79174	1.77955	1.76749	1.75556	1.74375	1.73205	60
30	1.73205	1.72047	1.70901	1.69766	1.68643	1.67530	1.66428	59
31	1.66428	1.65347	1.64256	1.63185	1.62125	1.61074	1.60033	58
32	1.60033	1.59002	1.57981	1.56969	1.55966	1.54972	1.53987	57
33	1.53987	1.53010	1.52043	1.51034	1.50133	1.49190	1.48256	56
34	1.48256	1.47330	1.46411	1.45501	1.44598	1.43703	1.42815	55
35	1.42815	1.41934	1.41061	1.40195	1.39336	1.38484	1.37638	54
36	1.37638	1.36800	1.35969	1.35142	1.34323	1.33511	1.32704	53
37	1.32704	1.31904	1.31110	1.30323	1.29541	1.28764	1.27994	52
38	1.27994	1.27230	1.26471	1.25717	1.24969	1.24227	1.23490	51
39	1.23490	1.22758	1.22031	1.21310	1.20593	1.19882	1.19175	50
40	1.19175	1.18474	1.17777	1.17085	1.16398	1.15715	1.15037	49
41	1.15037	1.14363	1.13694	1.13029	1.12369	1.11713	1.11061	48
42	1.11061	1.10414	1.09770	1.09131	1.08496	1.07864	1.07237	47
43	1.07237	1.06613	1.05994	1.05378	1.04766	1.04158	1.03553	46
44	1.03553	1.02952	1.02355	1.01761	1.01170	1.00583	1.00000	45
	60'	50'	40'	30'	20'	10'	0'	Degrees

TANGENT

DORMAN, LONG & CO. LIMITED.

LBS. RISING BY 7, EXPRESSED IN CWT'S.,
QRS. & LBS. AND IN DECIMALS OF A TON.

Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton
7	..	..	7	003125	336	3	0	0	15	672	6	0	0	3
14	..	..	14	00625	343	3	0	7	153125	679	6	0	7	303125
21	..	..	21	009375	350	3	0	14	15625	686	6	0	14	30625
28	..	1	0	0125	357	3	0	21	159375	693	6	0	21	309375
35	..	1	7	015625	364	3	1	0	1625	700	6	1	0	3125
42	..	1	14	01875	371	3	1	7	165625	707	6	1	7	315625
49	..	1	21	021875	378	3	1	14	16875	714	6	1	14	31875
56	..	2	0	025	385	3	1	21	171875	721	6	1	21	321875
63	..	2	7	028125	392	3	2	0	175	728	6	2	0	325
70	..	2	14	03125	399	3	2	7	178125	735	6	2	7	328125
77	..	2	21	034375	406	3	2	14	18125	742	6	2	14	33125
84	..	3	0	0375	413	3	2	21	184375	749	6	2	21	334375
91	..	3	7	040625	420	3	3	0	1875	756	6	3	0	3375
98	..	3	14	04375	427	3	3	7	190625	763	6	3	7	340625
105	..	3	21	046875	434	3	3	14	19375	770	6	3	14	34375
					441	3	3	21	196875	777	6	3	21	346875
112	1	0	0	05	448	4	0	0	2	784	7	0	0	35
119	1	0	7	053125	455	4	0	7	203125	791	7	0	7	353125
126	1	0	14	05625	462	4	0	14	20625	798	7	0	14	35625
133	1	0	21	059375	469	4	0	21	209375	805	7	0	21	359375
140	1	1	0	0625	476	4	1	0	2125	812	7	1	0	3625
147	1	1	7	065625	483	4	1	7	215625	819	7	1	7	365625
154	1	1	14	06875	490	4	1	14	21875	826	7	1	14	36875
161	1	1	21	071875	497	4	1	21	221875	833	7	1	21	371875
168	1	2	0	075	504	4	2	0	225	840	7	2	0	375
175	1	2	7	078125	511	4	2	7	228125	847	7	2	7	378125
182	1	2	14	08125	518	4	2	14	23125	854	7	2	14	38125
189	1	2	21	084375	525	4	2	21	234375	861	7	2	21	384375
196	1	3	0	0875	532	4	3	0	2375	868	7	3	0	3875
203	1	3	7	090625	539	4	3	7	240625	875	7	3	7	390625
210	1	3	14	09375	546	4	3	14	24375	882	7	3	14	39375
217	1	3	21	096875	553	4	3	21	246875	889	7	3	21	396875
224	2	0	0	1	560	5	0	0	25	896	8	0	0	4
231	2	0	7	103125	567	5	0	7	253125	903	8	0	7	403125
238	2	0	14	10625	574	5	0	14	25625	910	8	0	14	40625
245	2	0	21	109375	581	5	0	21	259375	917	8	0	21	409375
252	2	1	0	1125	588	5	1	0	2625	924	8	1	0	4125
259	2	1	7	115625	595	5	1	7	265625	931	8	1	7	415625
266	2	1	14	11875	602	5	1	14	26875	938	8	1	14	41875
273	2	1	21	121875	609	5	1	21	271875	945	8	1	21	421875
280	2	2	0	125	616	5	2	0	275	952	8	2	0	425
287	2	2	7	128125	623	5	2	7	278125	959	8	2	7	428125
294	2	2	14	13125	630	5	2	14	28125	966	8	2	14	43125
301	2	2	21	134375	637	5	2	21	284375	973	8	2	21	434375
308	2	3	0	1375	644	5	3	0	2875	980	8	3	0	4375
315	2	3	7	140625	651	5	3	7	290625	987	8	3	7	440625
322	2	3	14	14375	658	5	3	14	29375	994	8	3	14	44375
329	2	3	21	146875	665	5	3	21	296875	1001	8	3	21	446875

DORMAN, LONG & CO. LIMITED.

LBS. RISING BY 7, EXPRESSED IN CWTs.,
QRS. & LBS. AND IN DECIMALS OF A TON.

Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton	Lbs.	c.	q.	lbs.	Ton
1008	9	0	0	45	1344	12	0	0	6	1680	15	0	0	75
1016	9	0	7	453125	1351	12	0	7	603125	1687	15	0	7	753125
1022	9	0	14	45625	1358	12	0	14	60625	1694	15	0	14	75625
1029	9	0	21	459375	1365	12	0	21	609375	1701	15	0	21	759375
1036	9	1	0	4625	1372	12	1	0	6125	1708	15	1	0	7625
1043	9	1	7	465625	1379	12	1	7	615625	1715	15	1	7	765325
1050	9	1	14	46875	1386	12	1	14	61875	1722	15	1	14	76875
1057	9	1	21	471875	1393	12	1	21	621875	1729	15	1	21	771875
1064	9	2	0	475	1400	12	2	0	625	1736	15	2	0	775
1071	9	2	7	478125	1407	12	2	7	628125	1743	15	2	7	778125
1078	9	2	14	48125	1414	12	2	14	63125	1750	15	2	14	78125
1085	9	2	21	484375	1421	12	2	21	634375	1757	15	2	21	784375
1092	9	3	0	4875	1428	12	3	0	6375	1764	15	3	0	7875
1099	9	3	7	490625	1435	12	3	7	640625	1771	15	3	7	790625
1106	9	3	14	49375	1442	12	3	14	64375	1778	15	3	14	79375
1113	9	3	21	496875	1449	12	3	21	646875	1785	15	3	21	796875
1120	10	0	0	5	1456	13	0	0	65	1792	16	0	0	8
1127	10	0	7	503125	1463	13	0	7	653125	1799	16	0	7	803125
1134	10	0	14	50625	1470	13	0	14	65625	1806	16	0	14	80625
1141	10	0	21	509375	1477	13	0	21	659375	1813	16	0	21	809375
1148	10	1	0	5125	1484	13	1	0	6625	1820	16	1	0	8125
1155	10	1	7	515625	1491	13	1	7	665625	1827	16	1	7	815625
1162	10	1	14	51875	1498	13	1	14	66875	1834	16	1	14	81875
1169	10	1	21	521875	1505	13	1	21	671875	1841	16	1	21	821875
1176	10	2	0	525	1512	13	2	0	675	1848	16	2	0	825
1183	10	2	7	528125	1519	13	2	7	678125	1855	16	2	7	828125
1190	10	2	14	53125	1526	13	2	14	68125	1862	16	2	14	83125
1197	10	2	21	534375	1533	13	2	21	684375	1869	16	2	21	834375
1204	10	3	0	5375	1540	13	3	0	6875	1876	16	3	0	8375
1211	10	3	7	540625	1547	13	3	7	690625	1883	16	3	7	840625
1218	10	3	14	54375	1554	13	3	14	69375	1890	16	3	14	84375
1225	10	3	21	546875	1561	13	3	21	696875	1897	16	3	21	846875
1232	11	0	0	55	1568	14	0	0	7	1904	17	0	0	85
1239	11	0	7	553125	1575	14	0	7	703125	1911	17	0	7	853125
1246	11	0	14	55625	1582	14	0	14	70625	1918	17	0	14	85625
1253	11	0	21	559375	1589	14	0	21	709375	1925	17	0	21	859375
1260	11	1	0	5625	1596	14	1	0	7125	1932	17	1	0	8625
1267	11	1	7	565625	1603	14	1	7	715625	1939	17	1	7	865625
1274	11	1	14	56875	1610	14	1	14	71875	1946	17	1	14	86875
1281	11	1	21	571875	1617	14	1	21	721875	1953	17	1	21	871875
1288	11	2	0	575	1624	14	2	0	725	1960	17	2	0	875
1295	11	2	7	578125	1631	14	2	7	728125	1967	17	2	7	878125
1302	11	2	14	58125	1638	14	2	14	73125	1974	17	2	14	88125
1309	11	2	21	584375	1645	14	2	21	734375	1981	17	2	21	884375
1316	11	3	0	5875	1652	14	3	0	7375	1988	17	3	0	8875
1323	11	3	7	590625	1659	14	3	7	740625	1995	17	3	7	890625
1330	11	3	14	59375	1666	14	3	14	74375	2002	17	3	14	89375
1337	11	3	21	596875	1673	14	3	21	746875	2009	17	3	21	896875

DORMAN, LONG & CO. LIMITED.

LBS. RISING BY 7, EXPRESSED IN CWTs.,
QRS. & LBS. AND IN DECIMALS OF A TON—

CONTINUED.

Lbs.	c. q. lbs.	Ton	Lbs.	c. q. lbs.	Ton
2016	18 0 0	9	2128	19 0 0	95
2023	18 0 7	903125	2135	19 0 7	953125
2030	18 0 14	90625	2142	19 0 14	95625
2037	18 0 21	909375	2149	19 0 21	959375
2044	18 1 0	9125	2156	19 1 0	9625
2051	18 1 7	915625	2163	19 1 7	965625
2058	18 1 14	91875	2170	19 1 14	96875
2065	18 1 21	921875	2177	19 1 21	971875
2072	18 2 0	925	2184	19 2 0	975
2079	18 2 7	928125	2191	19 2 7	978125
2086	18 2 14	93125	2198	19 2 14	98125
2093	18 2 21	934375	2205	19 2 21	984375
2100	18 3 0	9375	2212	19 3 0	9875
2107	18 3 7	940625	2219	19 3 7	990625
2114	18 3 14	94375	2226	19 3 14	99375
2121	18 3 21	946875	2233	19 3 21	996875
			2240	20 0 0	1

CONVERSION TABLE TONS INTO POUNDS.

Tons	Pounds	Tons	Pounds	Tons	Pounds	Tons	Pounds
1	2,240	26	58,240	51	114,240	76	170,240
2	4,480	27	60,480	52	116,480	77	172,480
3	6,720	28	62,720	53	118,720	78	174,720
4	8,960	29	64,960	54	120,960	79	176,960
5	11,200	30	67,200	55	123,200	80	179,200
6	13,440	31	69,440	56	125,440	81	181,440
7	15,680	32	71,680	57	127,680	82	183,680
8	17,920	33	73,920	58	129,920	83	185,920
9	20,160	34	76,160	59	132,160	84	188,160
10	22,400	35	78,400	60	134,400	85	190,400
11	24,640	36	80,640	61	136,640	86	192,640
12	26,880	37	82,880	62	138,880	87	194,880
13	29,120	38	85,120	63	141,120	88	197,120
14	31,360	39	87,360	64	143,360	89	199,360
15	33,600	40	89,600	65	145,600	90	201,600
16	35,840	41	91,840	66	147,840	91	203,840
17	38,080	42	94,080	67	150,080	92	206,080
18	40,320	43	96,320	68	152,320	93	208,320
19	42,560	44	98,560	69	154,560	94	210,560
20	44,800	45	100,800	70	156,800	95	212,800
21	47,040	46	103,040	71	159,040	96	215,040
22	49,280	47	105,280	72	161,280	97	217,280
23	51,520	48	107,520	73	163,520	98	219,520
24	53,760	49	109,760	74	165,760	99	221,760
25	56,000	50	112,000	75	168,000	100	224,000

DORMAN, LONG & CO. LIMITED.

APPROXIMATE LIVE LOAD ON FLOORS.

Crowd of People	-	-	-	84 to 112 lbs. per sq. ft.
Floors of Dwellings and Offices	-	-	-	56 to 112 " " "
Floors of Public Halls, Churches, Theatres, &c.	-	-	-	100 to 160 " " "
Floors of Stores, Warehouses, &c.	-	-	-	100 to 300 " " "
Floors of Workshops carrying heavy machinery	-	-	-	200 to 400 " " "

APPROXIMATE WEIGHT, IN LBS. PER CUBIC FOOT, OF VARIOUS SUBSTANCES.

Barley	-	-	-	-	-	-	38
Wheat	-	-	-	-	-	-	48
Coal, ordinary, broken, loose	-	-	-	-	-	-	56
Coke	-	-	-	-	-	-	46
Concrete	-	-	-	-	-	-	112 to 130
Cast Iron	-	-	-	-	-	-	450
Lead	-	-	-	-	-	-	712
Masonry, granite	-	-	-	-	-	-	160
„ sandstone	-	-	-	-	-	-	140
Brickwork	-	-	-	-	-	-	112
Steel, rolled	-	-	-	-	-	-	489·6
Glass	-	-	-	-	-	-	160 to 190
Water, fresh	-	-	-	-	-	-	62·28

WEIGHT AND BULK OF WATER.

Fresh Water	—1 cubic foot = 6·228 gallons.
(at 62° Fahr.)	1 gallon = 10lbs.
	1 gallon = ·161 cubic foot.
	1 ton = 36 cubic feet.
	1 ton = 224 gallons.

The weight of fresh water is to that of sea water as 1 is to 1·026.

DORMAN, LONG & CO. LIMITED.

WEIGHTS AND MEASURES.

LINEAR MEASURE.

Inches	Feet	Yards	Pols	Furlongs	Mile
1	0.2539	0.2778	0.0050505	0.0012626	0.0001578
12	1	0.33333	0.0606061	0.0151515	0.0018939
36	3	1	0.1818182	0.0454545	0.0056818
192	16.5	5.5	1	0.25	0.03125
7920	660	220	40	1	0.125
63360	5280	1760	320	8	1

SURVEYING MEASURE (LINEAL).

Inches	Links	Feet	Yards	Chains	Mile
1	0.126	0.0833	0.0278	0.00126	0.000158
7.92	1	0.66	0.22	0.01	0.00125
12	1.515	1	0.333	0.01515	0.00189
36	4.545	3	1	0.04545	0.00563
792	100	66	22	1	0.125
63360	8000	5280	1760	80	1

CUBIC MEASURE.

Inches	Feet	Yards
1	0.0005787	0.0002143
1728	1	0.3704
46656	27	1

DORMAN, LONG & CO. LIMITED.

WEIGHTS AND MEASURES.

SQUARE MEASURE.

Square Inches	Square Feet	Square Yards	Square Poles	Roods	Acres	Square Mile
1	00694	000772	....	....	....	....
144	1	11111	003673	....	....	....
1296	9	1	033058	000826	....	....
272 25	30 25	1	025	00625	....	....
10890	1210	43	1	25	0003906	....
43560	4840	160	4	1	0015615	....
	3097600	102400	2560	640	1	....

MEASURE OF CAPACITY.

Pints	Quarts	Gallons	Pecks	Bushels	Quarters	Cubic Inches
1	5	125	0625	015625	001953125	34 683
2	1	25	125	03125	00390625	69 366
8	4	1	5	125	015625	277 463
16	8	2	1	25	03125	554 926
64	32	8	4	1	125	2219 704
512	256	64	32	8	1	17757 632

AVOIRDUPOIS WEIGHT.

Grains	Drams	Ounces	Pounds	Hundred-weights	Gross Ton
1	03687	002286	000143	00000128	000000637
27 34375	1	0625	003806	00003488	000001744
437 5	16	1	0625	00055804	00002790
7000	256	16	1	0089286	0004464
784000	28672	1792	112	1	05
15680000	573440	35840	2240	20	1

DORMAN, LONG & CO. LIMITED.

METRIC MEASURES.

LINEAR MEASURE.

Millimetres	Centimetres	Decimetres	Metres	Dekametres	Hectometres	Kilometre
1	.1	.01	.001	.0001	.00001	.000001
10	1	.1	.01	.001	.0001	.00001
100	10	1	.1	.01	.001	.0001
1000	100	10	1	.1	.01	.001
10000	1000	100	10	1	.1	.01
100000	10000	1000	100	10	1	.1
1000000	100000	10000	1000	100	10	1

SQUARE MEASURE.

Square Centimetres	Square Decimetres	Square Metres	Area or Square Decimetres	Hectare or Square Hectometre
1	.01	.0001	.00001	.00000001
100	1	.01	.0001	.000001
10000	100	1	.01	.0001
1000000	10000	100	1	.01
100000000	1000000	10000	100	1

CUBIC MEASURE.

Cubic Centimetres	Cubic Decimetres	Cubic Metres
1	.001	.000001
1000	1	.001
1000000	1000	1

DORMAN, LONG & CO. LIMITED.

METRIC MEASURES.

MEASURES OF CAPACITY.

Millilitres	Centilitres	Decilitres	Litres	Kilolitres	Hectolitres	Etolitres
1	·1	·01	·001	·0001	·00001	·000001
10	1·	·1	0·	·001	·0001	·00001
100	10·	1·	·1	·01	·001	·0001
1000	100·	10·	1·	·1	·01	·001
10000	1000·	100·	10·	1·	·1	·01
100000	10000·	1000·	100·	10·	1·	·1
1000000	100000·	100000·	1000	100·	10·	1·

WEIGHTS.

Milli-grammes	Centi-grammes	Deci-grammes	Grammes	Deka-grammes	Hecto-grammes	Kilo-gramme
1	·1	·01	·001	·0001	·00001	·000001
10	1·	·1	·01	·001	·0001	·00001
100	10	1·	·1	·01	·001	·0001
1000	100	10·	1·	·1	·01	·001
10000	1000	100·	10·	1·	·1	·01
100000	10000·	1000·	100·	10·	1·	·1
1000000	100000·	100000·	1000·	100·	10·	1·

DORMAN, LONG & CO. LIMITED.

METRICAL EQUIVALENTS OF BRITISH UNITS.

LINEAR MEASURE.

British Units	Metrical Equivalents	Metrical Units	British Equivalents
1 inch	= 2.5399541 centimetres	1 millimetre	= .63337 inches
1 " "	= .02539954 metres	1 centimetre	= .393708 " "
1 foot	= .30479449 " "	1 metre	= 39.37079 " "
1 yard	= .91438748 " "	1 " "	= 3.2808392 feet
1 fathom	= 1.82876696 " "	1 " "	= 1.0936333 yards
1 pole	= 5.02911 " "	1 kilometre	= 1093.63306 " "
1 chain	= 20.116437 " "	1 " "	= 4.971059 chains
1 fur long	= 201.16437 " "	1 " "	= 3280.83992 feet
1 mile	= 1609.34722 " "	1 " "	= .6213702 mile

SQUARE MEASURE.

British Units	Metrical Equivalents	Metrical Units	British Equivalents
1 sq. inch	= 6.451667 sq. centimetres	1 sq. centimetre	= .1550059 sq. inch
1 " foot	= .09290304 sq. metre	1 " metre	= 10.7642234 " feet
1 " yard	= .8360971 " "	1 " " "	= 1.1960333 " yards
1 " " "	= .000360971 are	1 are	= 119.60533 " "
1 acre	= .404671 hectare	1 hectare	= 2.47114 acres
1 sq. mile	= 258.99845 " "	1 " "	= .0038612 sq. mile

CUBIC MEASURE.

British Units	Metrical Equivalents	Metrical Units	British Equivalents
1 cubic inch	= 16.3871759 cubic centimetres	1 cubic centimetre	= .06102705 cubic inch
1 " foot	= .02831531 " metre	1 " metre	= 35.31658074 " feet
1 " yard	= .7645546 " "	1 " " "	= 1.30802151 " yards

CAPACITY.

British Units	Metrical Equivalents	Metrical Units	British Equivalents
1 cubic inch	= 16.387176 millilitres	1 millilitre	= .061027 cubic inch
1 " "	= 1.6387176 centilitres	1 centilitre	= .61027 " "
1 gill	= 14.1983 " "	1 " "	= .07043 gill
1 pint	= .567932 litres	1 litre	= 1.76077 pints
1 quart	= 1.135864 " "	1 " "	= .88038, quart
1 gallon	= 4.543458 " "	1 " "	= .2200967 gallons
1 " "	= .4543458 dekalitres	1 dekalitre	= 2.20097 " "
1 bushel	= 3.634766 " "	1 " "	= .275121 bushels
1 c.	= .3634766 hectolitre	1 hectolitre	= 2.75121 " "

• DORMAN, LONG & CO. LIMITED. •

METRICAL EQUIVALENTS OF BRITISH UNITS.

WEIGHT.

British Units	Metrical Equivalents	Metrical Units	British Equivalents
Avoirdupois			Avoirdupois
1 gram	= 64.79895 milligrammes	1 milligramme	= 0.1543235 grains
1 " "	= 6.479895 centigrammes	1 centigramme	= 0.1543235 " "
1 " "	= 0.6479895 grammes	1 gramme	= 15.43235 " "
1 ounce	= 28.34954 " "	1 " "	= 0.352739 ounces
1 " "	= 0.234954 kilogrammes	1 kilogramme	= 35.27394 " "
1 pound	= 453.59265 " "	1 " "	= 2.20462125 pounds
1 hundred-weight	= 50.802377 quintals	1 quintal	= 1.96841 hundred-weights
1 ton	= 1.01604754 milliers or tonnes	1 millier or tonne	= 904.20591 tons

MISCELLANEOUS COMPOUND MEASURES.

British Units	Metrical Equivalents	Metrical Units	British Equivalents
1 foot per second	= 3048 metres per second	1 metre per second	= 3.2809 feet per second
1 foot per minute	= 30.48 metres per minute	1 metre per minute	= 3.2809 feet per minute
1 mile per hour	= 1.6093 kilometres per hour	1 kilometre per hour	= 6214 miles per hour
1 pound per foot	= 1.49319 kilogrammes per metre	1 kilogramme per metre	= 67.196 pounds per foot
1 pound per yard	= 436.06 kilogrammes per metre	1 kilogramme per metre	= 2.01587 pounds per yard
1 pound per square inch	= 0.7031 kilogrammes per square centimetre	1 kilogramme per square centimetre	= 14.2232 pounds per square inch
1 pound per square foot	= 4.88261 kilogrammes per square metre	1 kilogramme per square metre	= 20.481 pounds per square foot
1 ton per square foot	= 10.93704 tonnes per square metre	1 tonne per square metre	= 0.9143 tons per square foot
1 pound per cubic inch	= 0.768 kilogrammes per cubic centimetre	1 kilogramme per cubic centimetre	= 36.1253 pounds per cubic inch
1 pound per cubic foot	= 16.0139 kilogrammes per cubic metre	1 kilogramme per cubic metre	= 0.624245 pounds per cubic foot
1 pound per cubic yard	= 5833 kilogrammes per cubic metre	1 kilogramme per cubic metre	= 1.68546 pounds per cubic yard
1 pound per gallon	= 0.9983 kilogrammes per litre	1 kilogramme per litre	= 10.0166 pounds per gallon

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS IN MILLIMETRES

OF INCHES AND FRACTIONS OF AN INCH ADVANCING BY 32nds.

Inches	0"	1"	2"	3"	4"	5"
... 0		25.400	50.799	76.199	101.598	126.998
$\frac{1}{32}$ ...	.794	26.193	51.593	76.992	102.392	127.791
$\frac{2}{32}$...	1.587	26.987	52.387	77.786	103.186	128.585
$\frac{3}{32}$...	2.381	27.781	53.180	78.580	103.979	129.379
... $\frac{1}{8}$	3.175	28.574	53.974	79.374	104.773	130.173
$\frac{5}{32}$...	3.969	29.368	54.768	80.167	105.567	130.966
$\frac{6}{32}$...	4.762	30.162	55.561	80.961	106.361	131.760
$\frac{7}{32}$...	5.556	30.956	56.355	81.755	107.154	132.554
... $\frac{1}{4}$	6.350	31.749	57.149	82.549	107.948	133.348
$\frac{9}{32}$...	7.144	32.543	57.943	83.342	108.742	134.141
$\frac{10}{32}$...	7.937	33.337	58.736	84.136	109.536	134.935
$\frac{11}{32}$...	8.731	34.131	59.530	84.930	110.329	135.729
... $\frac{3}{8}$	9.525	34.924	60.324	85.723	111.123	136.523
$\frac{13}{32}$...	10.319	35.713	61.118	86.517	111.917	137.316
$\frac{14}{32}$...	11.112	36.512	61.911	87.311	112.710	138.110
$\frac{15}{32}$...	11.906	37.306	62.705	88.105	113.504	138.904
... $\frac{1}{2}$	12.700	38.099	63.499	88.898	114.298	139.697
$\frac{17}{32}$...	13.494	38.893	64.293	89.692	115.092	140.491
$\frac{18}{32}$...	14.287	39.687	65.086	90.486	115.885	141.285
$\frac{19}{32}$...	15.081	40.481	65.880	91.280	116.679	142.079
... $\frac{5}{8}$	15.875	41.274	66.674	92.073	117.473	142.872
$\frac{21}{32}$...	16.668	42.068	67.468	92.867	118.267	143.666
$\frac{22}{32}$...	17.462	42.862	68.261	93.661	119.060	144.460
$\frac{23}{32}$...	18.256	43.655	69.055	94.455	119.854	145.254
... $\frac{3}{4}$	19.050	44.449	69.849	95.248	120.648	146.047
$\frac{25}{32}$...	19.843	45.243	70.642	96.042	121.442	146.841
$\frac{26}{32}$...	20.637	46.037	71.436	96.835	122.235	147.635
$\frac{27}{32}$...	21.431	46.830	72.230	97.629	123.029	148.429
... $\frac{7}{8}$	22.225	47.624	73.024	98.423	123.823	149.222
$\frac{29}{32}$...	23.018	48.418	73.817	99.217	124.617	150.016
$\frac{30}{32}$...	23.812	49.212	74.611	100.011	125.410	150.810
$\frac{31}{32}$...	24.606	50.005	75.405	100.804	126.204	151.604

12 Inches = 304.794 Millimetres

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS IN MILLIMETRES

OF INCHES AND FRACTIONS OF AN INCH ADVANCING BY 32nds.

Inches	6"	7"	8"	9"	10"	11"
0	152.337	177.797	203.136	228.596	253.995	279.395
1/32	153.191	178.591	203.930	229.390	254.789	280.189
1/16	153.985	179.384	204.734	230.183	255.583	280.982
1/8	154.778	180.178	205.578	230.977	256.377	281.776
3/32	155.572	180.972	206.371	231.771	257.170	282.570
1/4	156.366	181.765	207.165	232.565	257.964	283.364
5/32	157.160	182.559	207.959	233.358	258.758	284.157
3/16	157.953	183.353	208.752	234.152	259.552	284.951
7/32	158.747	184.147	209.546	234.946	260.345	285.745
1/2	159.541	184.940	210.340	235.739	261.139	286.539
9/32	160.335	185.734	211.134	236.533	261.933	287.332
5/16	161.128	186.528	211.927	237.327	262.727	288.126
11/32	161.922	187.322	212.721	238.121	263.520	288.920
3/8	162.716	188.115	213.515	238.914	264.314	289.714
13/32	163.510	188.909	214.309	239.708	265.108	290.507
7/16	164.303	189.703	215.102	240.502	265.901	291.301
15/32	165.097	190.497	215.896	241.296	266.695	292.095
1/2	165.891	191.290	216.690	242.089	267.489	292.888
17/32	166.684	192.084	217.484	242.883	268.283	293.682
9/16	167.478	192.878	218.277	243.677	269.076	294.476
19/32	168.272	193.672	219.071	244.471	269.870	295.270
5/8	169.066	194.465	219.865	245.264	270.664	296.063
11/16	169.859	195.259	220.659	246.058	271.458	296.857
23/32	170.653	196.053	221.452	246.852	272.251	297.651
3/4	171.447	196.846	222.246	247.646	273.045	298.445
25/32	172.241	197.640	223.040	248.439	273.839	299.238
27/32	173.034	198.434	223.833	249.233	274.633	300.032
13/16	173.828	199.228	224.627	250.027	275.426	300.826
29/32	174.622	200.021	225.421	250.820	276.220	301.620
3/4	175.416	200.815	226.215	251.614	277.014	302.413
31/32	176.209	201.609	227.008	252.408	277.807	303.207
1	177.003	202.403	227.802	253.202	278.601	304.001

12 Inches = 304.794 Millimetres.

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF MILLIMETRES IN INCHES.

Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches
1	·039	51	2·008	101	3·976	151	5·945	201	7·913
2	·079	52	2·047	102	4·016	152	5·984	202	7·953
3	·118	53	2·087	103	4·055	153	6·024	203	7·992
4	·157	54	2·126	104	4·095	154	6·063	204	8·032
5	·197	55	2·165	105	4·134	155	6·102	205	8·071
6	·236	56	2·205	106	4·173	156	6·142	206	8·110
7	·276	57	2·244	107	4·213	157	6·181	207	8·150
8	·315	58	2·283	108	4·252	158	6·221	208	8·189
9	·354	59	2·323	109	4·291	159	6·260	209	8·228
10	·394	60	2·362	110	4·331	160	6·299	210	8·268
11	·433	61	2·402	111	4·370	161	6·339	211	8·307
12	·472	62	2·441	112	4·409	162	6·378	212	8·347
13	·512	63	2·480	113	4·449	163	6·417	213	8·386
14	·551	64	2·520	114	4·488	164	6·456	214	8·425
15	·591	65	2·559	115	4·528	165	6·496	215	8·465
16	·630	66	2·598	116	4·567	166	6·535	216	8·504
17	·669	67	2·638	117	4·606	167	6·575	217	8·543
18	·709	68	2·677	118	4·646	168	6·614	218	8·583
19	·748	69	2·717	119	4·685	169	6·654	219	8·622
20	·787	70	2·756	120	4·724	170	6·693	220	8·661
21	·827	71	2·795	121	4·764	171	6·732	221	8·701
22	·866	72	2·835	122	4·803	172	6·772	222	8·740
23	·906	73	2·874	123	4·843	173	6·811	223	8·780
24	·945	74	2·913	124	4·882	174	6·850	224	8·819
25	·984	75	2·953	125	4·921	175	6·890	225	8·858
26	1·024	76	2·992	126	4·961	176	6·929	226	8·898
27	1·063	77	3·032	127	5·000	177	6·969	227	8·937
28	1·102	78	3·071	128	5·039	178	7·008	228	8·976
29	1·142	79	3·110	129	5·079	179	7·047	229	9·016
30	1·181	80	3·150	130	5·118	180	7·087	230	9·055
31	1·220	81	3·189	131	5·158	181	7·126	231	9·095
32	1·260	82	3·228	132	5·197	182	7·165	232	9·134
33	1·299	83	3·268	133	5·236	183	7·205	233	9·173
34	1·339	84	3·307	134	5·276	184	7·244	234	9·213
35	1·378	85	3·346	135	5·315	185	7·284	235	9·252
36	1·417	86	3·386	136	5·354	186	7·323	236	9·291
37	1·457	87	3·425	137	5·394	187	7·362	237	9·331
38	1·496	88	3·465	138	5·433	188	7·402	238	9·370
39	1·535	89	3·504	139	5·472	189	7·441	239	9·410
40	1·575	90	3·543	140	5·512	190	7·480	240	9·449
41	1·614	91	3·583	141	5·551	191	7·520	241	9·488
42	1·654	92	3·622	142	5·591	192	7·559	242	9·528
43	1·693	93	3·661	143	5·630	193	7·598	243	9·567
44	1·732	94	3·701	144	5·669	194	7·638	244	9·606
45	1·772	95	3·740	145	5·709	195	7·677	245	9·646
46	1·811	96	3·780	146	5·748	196	7·717	246	9·685
47	1·850	97	3·819	147	5·787	197	7·756	247	9·724
48	1·890	98	3·858	148	5·827	198	7·795	248	9·764
49	1·929	99	3·898	149	5·866	199	7·835	249	9·803
50	1·969	100	3·937	150	5·906	200	7·874	250	9·843

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF MILLIMETRES IN INCHES.

Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches
251	9.882	301	11.850	351	13.812	401	15.788	451	17.756
252	9.921	302	11.890	352	13.858	402	15.827	452	17.795
253	9.961	303	11.929	353	13.898	403	15.866	453	17.835
254	10.000	304	11.969	354	13.937	404	15.906	454	17.874
255	10.039	305	12.008	355	13.977	405	15.945	455	17.914
256	10.079	306	12.047	356	14.016	406	15.984	456	17.953
257	10.118	307	12.087	357	14.055	407	16.024	457	17.992
258	10.158	308	12.126	358	14.095	408	16.063	458	18.032
259	10.197	309	12.165	359	14.134	409	16.103	459	18.071
260	10.236	310	12.205	360	14.173	410	16.142	460	18.110
261	10.276	311	12.244	361	14.213	411	16.181	461	18.150
262	10.315	312	12.284	362	14.252	412	16.221	462	18.189
263	10.354	313	12.323	363	14.291	413	16.260	463	18.229
264	10.394	314	12.362	364	14.331	414	16.299	464	18.268
265	10.433	315	12.402	365	14.370	415	16.339	465	18.307
266	10.473	316	12.441	366	14.410	416	16.378	466	18.347
267	10.512	317	12.480	367	14.449	417	16.417	467	18.386
268	10.551	318	12.520	368	14.488	418	16.457	468	18.425
269	10.591	319	12.559	369	14.528	419	16.496	469	18.465
270	10.630	320	12.599	370	14.567	420	16.536	470	18.504
271	10.669	321	12.638	371	14.606	421	16.575	471	18.543
272	10.709	322	12.677	372	14.646	422	16.614	472	18.583
273	10.748	323	12.717	373	14.685	423	16.654	473	18.622
274	10.787	324	12.756	374	14.725	424	16.693	474	18.662
275	10.827	325	12.796	375	14.764	425	16.732	475	18.701
276	10.866	326	12.835	376	14.803	426	16.772	476	18.740
277	10.906	327	12.874	377	14.843	427	16.811	477	18.780
278	10.945	328	12.913	378	14.882	428	16.851	478	18.819
279	10.984	329	12.953	379	14.921	429	16.890	479	18.858
280	11.024	330	12.992	380	14.961	430	16.929	480	18.898
281	11.063	331	13.032	381	15.000	431	16.969	481	18.937
282	11.102	332	13.071	382	15.040	432	17.008	482	18.977
283	11.142	333	13.110	383	15.079	433	17.047	483	19.016
284	11.181	334	13.150	384	15.118	434	17.087	484	19.055
285	11.221	335	13.189	385	15.158	435	17.126	485	19.095
286	11.260	336	13.228	386	15.197	436	17.166	486	19.134
287	11.299	337	13.268	387	15.236	437	17.205	487	19.173
288	11.339	338	13.307	388	15.276	438	17.244	488	19.213
289	11.378	339	13.347	389	15.315	439	17.284	489	19.252
290	11.417	340	13.386	390	15.354	440	17.323	490	19.292
291	11.457	341	13.425	391	15.394	441	17.362	491	19.331
292	11.496	342	13.465	392	15.433	442	17.402	492	19.370
293	11.536	343	13.504	393	15.473	443	17.441	493	19.410
294	11.575	344	13.543	394	15.512	444	17.480	494	19.449
295	11.614	345	13.583	395	15.551	445	17.520	495	19.488
296	11.654	346	13.622	396	15.591	446	17.559	496	19.528
297	11.693	347	13.662	397	15.630	447	17.599	497	19.567
298	11.732	348	13.701	398	15.669	448	17.638	498	19.606
299	11.772	349	13.740	399	15.709	449	17.677	499	19.646
300	11.811	350	13.780	400	15.748	450	17.717	500	19.685

FORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF MILLIMETRES IN INCHES.

Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches
501	19.725	551	21.693	601	23.662	651	25.630	701	27.599
502	19.764	552	21.732	602	23.701	652	25.670	702	27.638
503	19.803	553	21.772	603	23.740	653	25.709	703	27.677
504	19.843	554	21.811	604	23.780	654	25.748	704	27.717
505	19.882	555	21.851	605	23.819	655	25.788	705	27.756
506	19.921	556	21.890	606	23.858	656	25.827	706	27.796
507	19.961	557	21.929	607	23.898	657	25.866	707	27.835
508	20.000	558	21.969	608	23.937	658	25.906	708	27.874
509	20.040	559	22.008	609	23.977	659	25.945	709	27.914
510	20.079	560	22.047	610	24.016	660	25.984	710	27.953
511	20.118	561	22.087	611	24.055	661	26.024	711	27.992
512	20.158	562	22.126	612	24.095	662	26.063	712	28.032
513	20.197	563	22.166	613	24.134	663	26.103	713	28.071
514	20.236	564	22.205	614	24.173	664	26.142	714	28.110
515	20.276	565	22.244	615	24.213	665	26.181	715	28.150
516	20.315	566	22.284	616	24.252	666	26.221	716	28.189
517	20.355	567	22.323	617	24.292	667	26.260	717	28.229
518	20.394	568	22.362	618	24.331	668	26.299	718	28.268
519	20.433	569	22.402	619	24.370	669	26.339	719	28.307
520	20.473	570	22.441	620	24.410	670	26.378	720	28.347
521	20.512	571	22.481	621	24.449	671	26.418	721	28.386
522	20.551	572	22.520	622	24.488	672	26.457	722	28.425
523	20.591	573	22.559	623	24.528	673	26.496	723	28.465
524	20.630	574	22.599	624	24.567	674	26.536	724	28.504
525	20.669	575	22.638	625	24.607	675	26.575	725	28.544
526	20.709	576	22.677	626	24.646	676	26.614	726	28.583
527	20.748	577	22.717	627	24.685	677	26.654	727	28.622
528	20.788	578	22.756	628	24.725	678	26.693	728	28.662
529	20.827	579	22.795	629	24.764	679	26.733	729	28.701
530	20.866	580	22.835	630	24.803	680	26.772	730	28.740
531	20.906	581	22.874	631	24.843	681	26.811	731	28.780
532	20.945	582	22.914	632	24.882	682	26.851	732	28.819
533	20.984	583	22.953	633	24.921	683	26.890	733	28.859
534	21.024	584	22.992	634	24.961	684	26.929	734	28.898
535	21.063	585	23.032	635	25.000	685	26.969	735	28.937
536	21.103	586	23.071	636	25.040	686	27.008	736	28.977
537	21.142	587	23.110	637	25.079	687	27.047	737	29.016
538	21.181	588	23.150	638	25.118	688	27.087	738	29.055
539	21.221	589	23.189	639	25.158	689	27.126	739	29.095
540	21.260	590	23.229	640	25.197	690	27.166	740	29.134
541	21.299	591	23.268	641	25.236	691	27.205	741	29.173
542	21.339	592	23.307	642	25.276	692	27.244	742	29.213
543	21.378	593	23.347	643	25.315	693	27.284	743	29.252
544	21.418	594	23.385	644	25.355	694	27.323	744	29.292
545	21.457	595	23.424	645	25.394	695	27.362	745	29.331
546	21.496	596	23.464	646	25.433	696	27.402	746	29.370
547	21.536	597	23.503	647	25.473	697	27.441	747	29.410
548	21.575	598	23.543	648	25.512	698	27.481	748	29.449
549	21.614	599	23.582	649	25.551	699	27.520	749	29.488
550	21.654	600	23.622	650	25.591	700	27.559	750	29.528

DORMAN, LONG, & CO. LIMITED.

EQUIVALENTS OF MILLIMETRES IN INCHES.

Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches	Milli- metres	Inches
751	29.567	801	31.536	851	33.504	901	35.473	951	37.441
752	29.607	802	31.575	852	33.544	902	35.512	952	37.481
753	29.646	803	31.614	853	33.583	903	35.552	953	37.520
754	29.685	804	31.654	854	33.622	904	35.591	954	37.559
755	29.725	805	31.693	855	33.662	905	35.630	955	37.599
756	29.764	806	31.733	856	33.701	906	35.670	956	37.638
757	29.803	807	31.772	857	33.740	907	35.709	957	37.677
758	29.843	808	31.811	858	33.780	908	35.748	958	37.717
759	29.882	809	31.851	859	33.819	909	35.788	959	37.756
760	29.922	810	31.890	860	33.859	910	35.827	960	37.796
761	29.961	811	31.929	861	33.898	911	35.866	961	37.835
762	30.000	812	31.969	862	33.937	912	35.906	962	37.874
763	30.040	813	32.008	863	33.977	913	35.945	963	37.914
764	30.079	814	32.048	864	34.016	914	35.985	964	37.953
765	30.118	815	32.087	865	34.055	915	36.024	965	37.992
766	30.158	816	32.126	866	34.095	916	36.063	966	38.032
767	30.197	817	32.165	867	34.134	917	36.103	967	38.071
768	30.236	818	32.205	868	34.174	918	36.142	968	38.111
769	30.275	819	32.244	869	34.213	919	36.181	969	38.150
770	30.315	820	32.284	870	34.252	920	36.221	970	38.189
771	30.355	821	32.323	871	34.292	921	36.260	971	38.229
772	30.394	822	32.362	872	34.331	922	36.300	972	38.268
773	30.433	823	32.401	873	34.370	923	36.339	973	38.307
774	30.473	824	32.441	874	34.410	924	36.378	974	38.347
775	30.512	825	32.481	875	34.449	925	36.418	975	38.386
776	30.551	826	32.520	876	34.489	926	36.457	976	38.426
777	30.591	827	32.559	877	34.528	927	36.496	977	38.465
778	30.630	828	32.599	878	34.567	928	36.536	978	38.504
779	30.670	829	32.638	879	34.607	929	36.575	979	38.544
780	30.709	830	32.677	880	34.646	930	36.615	980	38.583
781	30.748	831	32.717	881	34.685	931	36.654	981	38.622
782	30.788	832	32.756	882	34.725	932	36.693	982	38.662
783	30.827	833	32.795	883	34.764	933	36.733	983	38.701
784	30.866	834	32.835	884	34.803	934	36.772	984	38.741
785	30.906	835	32.874	885	34.843	935	36.811	985	38.780
786	30.945	836	32.914	886	34.882	936	36.851	986	38.819
787	30.985	837	32.953	887	34.922	937	36.890	987	38.859
788	31.024	838	32.992	888	34.961	938	36.929	988	38.898
789	31.063	839	33.032	889	35.000	939	36.969	989	38.937
790	31.103	840	33.071	890	35.040	940	37.008	990	38.977
791	31.142	841	33.111	891	35.079	941	37.048	991	39.016
792	31.181	842	33.150	892	35.118	942	37.087	992	39.055
793	31.221	843	33.189	893	35.158	943	37.125	993	39.095
794	31.260	844	33.229	894	35.197	944	37.166	994	39.134
795	31.299	845	33.268	895	35.237	945	37.205	995	39.174
796	31.339	846	33.307	896	35.276	946	37.244	996	39.213
797	31.378	847	33.347	897	35.315	947	37.284	997	39.252
798	31.418	848	33.386	898	35.355	948	37.323	998	39.292
799	31.457	849	33.425	899	35.394	949	37.363	999	39.331
800	31.496	850	33.465	900	35.433	950	37.402	1000	39.370

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF METRES IN FEET.

1 Metre = 3.28089 Feet.

Metres	0	1	2	3	4	5	6	7	8	9
1	3.2809	3.6090	3.9371	4.2652	4.5933	4.9213	5.2494	5.5775	5.9056	6.2337
2	6.5618	6.8899	7.2180	7.5461	7.8742	8.2022	8.5303	8.8584	9.1865	9.5146
3	9.8427	10.1708	10.4989	10.8270	11.1551	11.4831	11.8112	12.1393	12.4674	12.7955
4	13.1236	13.4517	13.7798	14.1079	14.4360	14.7640	15.0921	15.4202	15.7483	16.0764
5	16.4045	16.7326	17.0607	17.3888	17.7169	18.0449	18.3730	18.7011	19.0292	19.3573
6	19.6854	20.0135	20.3416	20.6697	20.9978	21.3258	21.6539	21.9820	22.3101	22.6382
7	22.9663	23.2944	23.6225	23.9506	24.2787	24.6067	24.9348	25.2629	25.5910	25.9191
8	26.2472	26.5753	26.9034	27.2315	27.5596	27.8876	28.2157	28.5438	28.8719	29.2000
9	29.5281	29.8562	30.1843	30.5124	30.8405	31.1685	31.4966	31.8247	32.1528	32.4809
10	32.8090	33.1371	33.4652	33.7933	34.1213	34.4494	34.7775	35.1056	35.4337	35.7618

EQUIVALENTS OF FEET IN METRES.

1 Foot = .3047945 of 1 Metre.

Feet	0	1	2	3	4	5	6	7	8	9
1	.30480	.35527	.40575	.45623	.50671	.55719	.60767	.65815	.70863	.75911
2	.60959	.66007	.71055	.76103	.81151	.86199	.91247	.96294	1.01342	1.06390
3	.91438	.96486	1.01534	1.06582	1.11630	1.16678	1.21726	1.26774	1.31822	1.36870
4	1.21918	1.26966	1.32014	1.37062	1.42110	1.47158	1.52206	1.57254	1.62302	1.67350
5	1.52397	1.57445	1.62493	1.67541	1.72589	1.77637	1.82685	1.87733	1.92781	1.97829
6	1.82877	1.87925	1.92973	1.98020	1.95068	1.98116	2.01164	2.04212	2.07260	2.10308
7	2.13356	2.16404	2.19452	2.22500	2.25548	2.28596	2.31644	2.34692	2.37740	2.40788
8	2.43836	2.46884	2.49931	2.52979	2.56027	2.59075	2.62123	2.65171	2.68219	2.71267
9	2.74315	2.77363	2.80411	2.83459	2.86507	2.89555	2.92603	2.95651	2.98699	3.01747
10	3.04794	3.07842	3.10890	3.13938	3.16986	3.20034	3.23082	3.26130	3.29178	3.32226

EQUIVALENTS OF SQUARE CENTIMETRES IN SQUARE INCHES.

1 Square Centimetre = .1550059 of 1 Square Inch.

Square Cent.	0	1	2	3	4	5	6	7	8	9
1	.15501	.17051	.18601	.20151	.21701	.23251	.24801	.26351	.27901	.29451
2	.31001	.32551	.34101	.35651	.37201	.38751	.40301	.41852	.43402	.44952
3	.46502	.48052	.49602	.51152	.52702	.54252	.55802	.57352	.58902	.60452
4	.62003	.63552	.65102	.66652	.68203	.69753	.71303	.72853	.74403	.75953
5	.77503	.79053	.80603	.82153	.83703	.85253	.86803	.88353	.89903	.91453
6	.93004	.94554	.96104	.97654	.99204	1.00754	1.02304	1.03854	1.05404	1.06954
7	1.08504	1.10054	1.11604	1.13154	1.14704	1.16254	1.17804	1.19355	1.20905	1.22455
8	1.24005	1.25555	1.27105	1.28655	1.30205	1.31755	1.33305	1.34855	1.36405	1.37955
9	1.39505	1.41055	1.42605	1.44156	1.45706	1.47256	1.48806	1.50356	1.51906	1.53456
10	1.55006	1.56556	1.58106	1.59656	1.61206	1.62756	1.64306	1.65856	1.67406	1.68956

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF SQUARE INCHES IN
SQUARE CENTIMETRES.

1 Square Inch = 6.451367 Square Centimetres.

Square Inches	0	1	2	3	4	5	6	7	8	9
1	6.4514	7.0965	7.7416	8.3868	9.0319	9.6770	10.3222	10.9673	11.6125	12.2576
2	12.9027	13.5479	14.1930	14.8381	15.4833	16.1284	16.7736	17.4187	18.0638	18.7090
3	19.3541	19.9992	20.6444	21.2895	21.9346	22.5798	23.2249	23.8701	24.5152	25.1603
4	25.8055	26.4506	27.0957	27.7409	28.3860	29.0312	29.6763	30.3214	30.9666	31.6117
5	32.2568	32.9020	33.5471	34.1922	34.8374	35.4825	36.1277	36.7728	37.4179	38.0631
6	38.7082	39.3533	39.9985	40.6436	41.2887	41.9339	42.5790	43.2242	43.8693	44.5144
7	45.1596	45.8047	46.4498	47.0950	47.7401	48.3853	49.0304	49.6755	50.3207	50.9658
8	51.6109	52.2561	52.9012	53.5463	54.1915	54.8366	55.4818	56.1269	56.7720	57.4172
9	58.0623	58.7074	59.3526	59.9977	60.6428	61.2880	61.9331	62.5783	63.2234	63.8685
10	64.5137	65.1588	65.8039	66.4491	67.0942	67.7394	68.3845	69.0296	69.6748	70.3199

EQUIVALENTS OF SQUARE METRES IN
SQUARE FEET.

1 Square Metre = 10.764229 Square Feet.

Square Metres	0	1	2	3	4	5	6	7	8	9
1	10.764	11.841	12.917	13.994	15.070	16.146	17.223	18.299	19.376	20.452
2	21.528	22.605	23.681	24.758	25.834	26.911	27.987	29.064	30.140	31.216
3	32.293	33.369	34.446	35.522	36.599	37.675	38.752	39.828	40.904	41.981
4	43.057	44.134	45.210	46.286	47.363	48.439	49.516	50.592	51.669	52.745
5	53.821	54.898	55.974	57.051	58.127	59.204	60.280	61.356	62.433	63.509
6	64.586	65.662	66.739	67.815	68.892	69.968	71.044	72.121	73.197	74.274
7	75.350	76.427	77.503	78.579	79.656	80.732	81.809	82.885	83.962	85.038
8	86.114	87.191	88.267	89.344	90.420	91.497	92.573	93.649	94.726	95.802
9	96.879	97.955	99.032	100.108	101.184	102.261	103.337	104.414	105.490	106.567
10	107.643	108.719	109.796	110.872	111.949	113.025	114.102	115.178	116.254	117.331

EQUIVALENTS OF SQUARE FEET IN
SQUARE METRES.

1 Square Foot = .09290317 of a Square Metre.

Square Feet	0	1	2	3	4	5	6	7	8	9
1	.09290	.10219	.11148	.12077	.13006	.13935	.14864	.15793	.16722	.17651
2	.18580	.19509	.20438	.21367	.22296	.23225	.24154	.25083	.26012	.26941
3	.27870	.28799	.29728	.30657	.31586	.32515	.33444	.34373	.35302	.36231
4	.37160	.38089	.39018	.39947	.40876	.41805	.42734	.43663	.44592	.45521
5	.46450	.47379	.48308	.49237	.50166	.51095	.52024	.52953	.53882	.54811
6	.55740	.56669	.57598	.58527	.59456	.60385	.61314	.62243	.63172	.64101
7	.65030	.65959	.66888	.67817	.68746	.69675	.70604	.71533	.72462	.73391
8	.74320	.75249	.76178	.77107	.78036	.78965	.79894	.80823	.81752	.82681
9	.83610	.84539	.85468	.86397	.87326	.88255	.89184	.90113	.91042	.91971
10	.92900	.93829	.94758	.95687	.96616	.97545	.98474	.99403	1.00332	1.01261

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF CUBIC CENTIMETRES IN CUBIC INCHES.

1 Cubic Centimetre = .06102705 of a Cubic Inch.

Cubic Cent.	0	1	2	3	4	5	6	7	8	9
1	.061027	.067130	.073232	.079335	.085438	.091541	.097643	.103746	.109849	.115951
2	.122054	.128157	.134260	.140362	.146465	.152568	.158670	.164773	.170876	.176979
3	.183081	.189184	.195287	.201389	.207492	.213595	.219697	.225800	.231903	.238006
4	.244108	.250211	.256314	.262416	.268519	.274622	.280724	.286827	.292930	.299033
5	.305135	.311238	.317341	.323443	.329546	.335649	.341751	.347854	.353957	.360060
6	.366162	.372265	.378368	.384470	.390573	.396676	.402779	.408881	.414984	.421087
7	.427189	.433292	.439395	.445497	.451600	.457703	.463806	.469908	.476011	.482114
8	.488216	.494319	.500422	.506525	.512627	.518730	.524833	.530936	.537038	.543141
9	.549243	.555346	.561449	.567552	.573654	.579757	.585860	.591962	.598065	.604168
10	.610271	.616373	.622476	.628579	.634681	.640784	.646887	.652990	.659092	.665195

EQUIVALENTS OF CUBIC INCHES IN CUBIC CENTIMETRES.

1 Cubic Inch = 16.386176 Cubic Centimetres.

Cubic In.	0	1	2	3	4	5	6	7	8	9
1	16.386	18.025	19.663	21.302	22.941	24.579	26.218	27.856	29.495	31.134
2	32.772	34.411	36.050	37.689	39.327	40.965	42.604	44.243	45.881	47.520
3	49.158	50.797	52.436	54.074	55.713	57.351	58.990	60.629	62.267	63.906
4	65.545	67.183	68.822	70.461	72.100	73.738	75.377	77.015	78.654	80.292
5	81.931	83.569	85.208	86.847	88.485	90.124	91.763	93.401	95.040	96.678
6	98.317	99.956	101.594	103.233	104.872	106.510	108.149	109.787	111.426	113.065
7	114.703	116.342	117.980	119.619	121.258	122.896	124.535	126.174	127.812	129.451
8	131.089	132.728	134.367	136.005	137.644	139.282	140.921	142.560	144.198	145.837
9	147.476	149.114	150.753	152.391	154.030	155.669	157.307	158.945	160.584	162.222
10	163.862	165.500	167.139	168.778	170.416	172.055	173.693	175.332	176.971	178.609

EQUIVALENTS OF CUBIC METRES IN CUBIC FEET.

1 Cubic Metre = 35.3165 Cubic Feet.

Cubic Metres	0	1	2	3	4	5	6	7	8	9
1	35.317	38.848	42.380	45.912	49.443	52.975	56.507	60.038	63.570	67.101
2	70.635	74.166	77.696	81.228	84.760	88.291	91.823	95.355	98.886	102.418
3	105.950	109.481	113.013	116.545	120.076	123.608	127.140	130.671	134.203	137.735
4	141.266	144.798	148.330	151.861	155.393	158.925	162.456	165.988	169.520	173.051
5	176.583	180.115	183.646	187.178	190.710	194.241	197.773	201.305	204.836	208.368
6	211.899	215.431	218.963	222.494	226.026	229.558	233.089	236.621	240.153	243.684
7	247.216	250.748	254.279	257.811	261.343	264.874	268.406	271.938	275.469	279.001
8	282.533	286.064	289.596	293.128	296.659	300.191	303.723	307.254	310.786	314.318
9	317.849	321.381	324.913	328.444	331.976	335.508	339.039	342.571	346.103	349.634
10	353.166	356.697	360.229	363.761	367.292	370.824	374.356	377.887	381.419	384.951

DORMAN, LONG, & CO. LIMITED.

EQUIVALENTS OF CUBIC FEET IN
CUBIC METRES.

1 Cubic Foot = .02831551 of a Cubic Metre.

Cubic Feet	0	1	2	3	4	5	6	7	8	9
1	.028315	.031147	.033978	.036810	.039641	.042473	.045304	.048136	.050968	.053798
2	.056631	.059462	.062294	.065125	.067957	.070788	.073620	.076451	.079283	.082114
3	.084946	.087777	.090609	.093441	.096272	.099104	.101935	.104767	.107598	.110430
4	.113261	.116093	.118924	.121756	.124587	.127419	.130250	.133082	.135913	.138745
5	.141577	.144408	.147240	.150071	.152903	.155734	.158566	.161397	.164229	.167060
6	.169892	.172723	.175555	.178386	.181218	.184050	.186881	.189713	.192544	.195376
7	.198207	.201039	.203870	.206702	.209533	.212365	.215196	.218028	.220859	.223691
8	.226522	.229354	.232186	.235017	.237849	.240680	.243512	.246343	.249175	.252006
9	.254838	.257669	.260501	.263332	.266164	.268995	.271827	.274659	.277490	.280322
10	.283153	.285985	.288816	.291648	.294479	.297311	.300142	.302974	.305805	.308637

EQUIVALENTS OF KILOGRAMMES IN POUNDS.

1 Kilogramme = 2.20462125 Pounds.

Kilo-grammes	0	1	2	3	4	5	6	7	8	9
1	2.2046	2.4251	2.6455	2.8660	3.0865	3.3069	3.5274	3.7479	3.9683	4.1888
2	4.4092	4.6297	4.8502	5.0706	5.2911	5.5116	5.7320	5.9525	6.1729	6.3934
3	6.6139	6.8344	7.0548	7.2753	7.4957	7.7162	7.9366	8.1571	8.3776	8.5980
4	8.8185	9.0390	9.2594	9.4799	9.7003	9.9208	10.1413	10.3617	10.5822	10.8026
5	11.0231	11.2436	11.4640	11.6845	11.9050	12.1254	12.3459	12.5663	12.7868	13.0073
6	13.2277	13.4482	13.6687	13.8891	14.1096	14.3300	14.5505	14.7710	14.9914	15.2119
7	15.4323	15.6528	15.8733	16.0937	16.3142	16.5347	16.7551	16.9756	17.1960	17.4165
8	17.6370	17.8574	18.0779	18.2984	18.5188	18.7393	18.9597	19.1802	19.4007	19.6211
9	19.8416	20.0621	20.2825	20.5030	20.7234	20.9439	21.1643	21.3848	21.6053	21.8258
10	22.0462	22.2667	22.4871	22.7076	22.9280	23.1485	23.3690	23.5894	23.8099	24.0304

EQUIVALENTS OF POUNDS IN KILOGRAMMES.

1 Pound = 0.45359235 of a Kilogramme.

Pounds	0	1	2	3	4	5	6	7	8	9
1	.45359	.49895	.54431	.58967	.63503	.68039	.72575	.77111	.81647	.86183
2	.90719	.95254	.99790	1.04326	1.08862	1.13398	1.17934	1.22470	1.27006	1.31542
3	1.36078	1.40614	1.45150	1.49686	1.54222	1.58757	1.63293	1.67829	1.72365	1.76901
4	1.81437	1.85973	1.90509	1.95045	1.99581	2.04117	2.08653	2.13189	2.17724	2.22260
5	2.26796	2.31332	2.35868	2.40404	2.44940	2.49476	2.54012	2.58548	2.63084	2.67620
6	2.72156	2.76692	2.81227	2.85763	2.90299	2.94835	2.99371	3.03907	3.08443	3.12979
7	3.17515	3.22051	3.26587	3.31123	3.35659	3.40194	3.44730	3.49266	3.53802	3.58338
8	3.62874	3.67410	3.71946	3.76482	3.81018	3.85554	3.90090	3.94626	3.99162	4.03697
9	4.08233	4.12769	4.17305	4.21841	4.26377	4.30913	4.35449	4.39985	4.44521	4.49057
10	4.53593	4.58129	4.62664	4.67200	4.71736	4.76272	4.80808	4.85344	4.89880	4.94416

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF KILOGRAMMES PER SQUARE CENTIMETRE IN POUNDS PER SQUARE INCH.

1 Kilogramme per Square Centimetre = 14.2222 Pounds per Square Inch.

Kilogramme per Square Centimetre	0	1	2	3	4	5	6	7	8	9
1	14.223	15.645	17.067	18.490	19.912	21.334	22.757	24.179	25.601	27.023
2	28.446	29.868	31.290	32.712	34.135	35.557	36.979	38.402	39.824	41.246
3	42.668	44.091	45.513	46.935	48.358	49.780	51.202	52.624	54.047	55.469
4	56.891	58.314	59.736	61.158	62.580	64.003	65.425	66.847	68.270	69.692
5	71.114	72.536	73.959	75.381	76.803	78.226	79.648	81.070	82.492	83.915
6	88.337	89.759	91.181	92.604	94.026	95.448	96.871	98.293	99.715	101.137
7	109.560	110.982	112.404	113.827	115.249	116.671	118.093	119.516	120.938	122.360
8	123.783	125.205	126.627	128.049	129.471	130.894	132.316	133.739	135.161	136.583
9	138.005	139.428	140.850	142.272	143.695	145.117	146.539	147.961	149.384	150.806
10	152.228	153.650	155.073	156.495	157.917	159.340	160.762	162.184	163.606	165.029

EQUIVALENTS OF POUNDS PER SQUARE INCH IN KILOGRAMMES PER SQUARE CENTIMETRE.

1 Pound per Square Inch = 0.07030954 of a Kilogramme per Square Centimetre.

Pounds	0	1	2	3	4	5	6	7	8	9
1	0.070310	0.077340	0.084371	0.091402	0.098433	0.105464	0.112495	0.119526	0.126557	0.133588
2	0.140619	0.147650	0.154681	0.161712	0.168743	0.175774	0.182805	0.189836	0.196867	0.203898
3	0.210929	0.217960	0.224991	0.232021	0.239052	0.246083	0.253114	0.260145	0.267175	0.274207
4	0.281238	0.288269	0.295300	0.302331	0.309362	0.316393	0.323424	0.330455	0.337486	0.344517
5	0.351548	0.358579	0.365610	0.372641	0.379672	0.386702	0.393733	0.400764	0.407795	0.414826
6	0.421857	0.428888	0.435919	0.442950	0.449981	0.457012	0.464043	0.471074	0.478105	0.485136
7	0.492167	0.499198	0.506229	0.513260	0.520291	0.527322	0.534353	0.541383	0.548414	0.555445
8	0.562476	0.569507	0.576538	0.583569	0.590600	0.597631	0.604662	0.611693	0.618724	0.625755
9	0.632786	0.639817	0.646848	0.653879	0.660910	0.667941	0.674972	0.682003	0.689033	0.696064
10	0.703095	0.710126	0.717157	0.724188	0.731219	0.738250	0.745281	0.752312	0.759343	0.766374

EQUIVALENTS OF KILOGRAMMES PER METRE IN POUNDS PER FOOT.

Kilo- grammes per Metre	0	1	2	3	4	5	6	7	8	9
1	6.720	7.392	8.063	8.735	9.407	10.079	10.751	11.423	12.095	12.767
2	1.3439	1.4111	1.4783	1.5455	1.6127	1.6799	1.7471	1.8143	1.8815	1.9487
3	2.0159	2.0831	2.1503	2.2175	2.2847	2.3518	2.4190	2.4862	2.5534	2.6206
4	2.6878	2.7550	2.8222	2.8894	2.9566	3.0238	3.0910	3.1582	3.2254	3.2926
5	3.3598	3.4270	3.4942	3.5614	3.6286	3.6958	3.7630	3.8302	3.8973	3.9645
6	4.0317	4.0989	4.1661	4.2333	4.3005	4.3677	4.4349	4.5021	4.5693	4.6365
7	4.7037	4.7709	4.8381	4.9053	4.9725	5.0397	5.1069	5.1741	5.2413	5.3085
8	5.3757	5.4428	5.5100	5.5772	5.6444	5.7116	5.7788	5.8460	5.9132	5.9804
9	6.0476	6.1148	6.1820	6.2492	6.3164	6.3836	6.4508	6.5180	6.5852	6.6524
10	6.7196	6.7868	6.8540	6.9212	6.9883	7.0555	7.1227	7.1899	7.2571	7.3243

DORMAN, LONG & CO. LIMITED.

EQUIVALENTS OF POUNDS PER FOOT IN
KILOGRAMMES PER METRE.

Pounds per Foot	0	1	2	3	4	5	6	7	8	9
1	1.4332	1.6370	1.7858	1.9346	2.0835	2.2323	2.3811	2.5299	2.6787	2.8276
2	2.9764	3.1252	3.2740	3.4228	3.5717	3.7205	3.8693	4.0181	4.1669	4.3158
3	4.4646	4.6134	4.7622	4.9110	5.0599	5.2087	5.3575	5.5063	5.6551	5.8039
4	5.9528	6.1016	6.2504	6.3992	6.5480	6.6969	6.8457	6.9945	7.1433	7.2921
5	7.4410	7.5898	7.7386	7.8874	8.0362	8.1851	8.3339	8.4827	8.6315	8.7803
6	8.9292	9.0780	9.2268	9.3756	9.5244	9.6732	9.8221	9.9709	10.1197	10.2685
7	10.4173	10.5662	10.7150	10.8638	11.0126	11.1614	11.3103	11.4591	11.6079	11.7567
8	11.9055	12.0544	12.2032	12.3520	12.5008	12.6496	12.7984	12.9473	13.0961	13.2449
9	13.3937	13.5425	13.6914	13.8402	13.9890	14.1378	14.2866	14.4355	14.5843	14.7331
10	14.8819	15.0307	15.1796	15.3284	15.4772	15.6260	15.7748	15.9237	16.0725	16.2213

EQUIVALENTS OF MOMENTS OF INERTIA
AND SECTION MODULI.Moment of Inertia in centimetre units = Moment of Inertia in inch units $\times 41.62$ Moment of Inertia in inch units = Moment of Inertia in centimetre units $\times .024$ Section Modulus in centimetre units = Section Modulus in inch units $\times 16.386$ Section Modulus in inch units = Section Modulus in centimetre units $\times .061$

CONTRACTIONS GENERALLY ADOPTED.

Linear Measure	Square Measure	Cubic Measure	Capacity	Weight
<i>km</i> = kilometre	<i>km</i> ² = sq. kilometre	<i>km</i> ³ = cub. kilometre	<i>hl</i> = hectolitre	<i>t</i> = tonne = 1000 <i>kg</i>
<i>m</i> = metre	<i>m</i> ² = " metre	<i>m</i> ³ = " metre	<i>l</i> = litre	<i>q</i> = quintal = 100 <i>kg</i>
<i>dm</i> = decimetre	<i>dm</i> ² = " decimetre	<i>dm</i> ³ = " decimetre	<i>dl</i> = decilitre	<i>kg</i> = kilogramme
<i>cm</i> = centimetre	<i>cm</i> ² = " centimetre	<i>cm</i> ³ = " centimetre	<i>cl</i> = centilitre	<i>dag</i> = decagramme
<i>mm</i> = millimetre	<i>mm</i> ² = " millimetre	<i>mm</i> ³ = " millimetre		<i>g</i> = gramme
	<i>ha</i> = hectare			<i>dg</i> = decigramme
	<i>a</i> = are			<i>cg</i> = centigramme
				<i>mg</i> = milligramme

ITALIC letters are used for these contractions, and no stop is used at the right of them.

The contractions succeed the figures to which they refer, on the same line and after the last decimal place, when decimals are used.

DORMAN LONG & CO. LIMITED.

COMPARISON OF WEIGHTS OF STEEL PLATES
TO 1 INCH THICK.

Divided into 32nds and 40ths of an Inch, and Millimetres.

Milli- metres	Weight in lbs. per sq. foot	32nds	16ths	20ths	40ths	Weight in lbs. per sq. foot	Milli- metres
25	40.80	32	16	20	40	40.80	25
	39.525	31			39	39.78	
24	38.25	30	15	19	38	38.76	24
					37	37.74	
23	36.975	29		18	36	36.72	23
					35	35.70	
22	35.70	28	14		34	34.68	22
	34.425	27		17	33	33.66	
21	33.15	26	13		32	32.64	21
	31.875	25		16	31	31.62	
20	30.60	24	12		30	30.60	20
					29	29.58	
19	29.325	23		14	28	28.56	19
	28.05	22	11		27	27.54	
18	26.775	21		13	26	26.52	18
	25.50	20	10		25	25.50	
17	24.225	19		12	24	24.48	17
	22.95	18	9		23	23.46	
16	21.675	17		11	22	22.44	16
	20.40	16	8		21	21.42	
15	19.125	15		10	20	20.40	15
	17.85	14	7		19	19.38	
14	16.575	13		9	18	18.36	14
	15.30	12	6		17	17.34	
13	14.025	11		8	16	16.32	13
	12.75	10	5		15	15.30	
12	11.475	9		7	14	14.28	12
	10.20	8	4		13	13.26	
11	8.925	7		6	12	12.24	11
	7.65	6	3		11	11.22	
10	6.375	5		5	10	10.20	10
	5.10	4	2		9	9.18	
9	3.825	3		4	8	8.16	9
	2.55	2	1		7	7.14	
8	1.275	1		3	6	6.12	8
				2	5	5.10	
7				1	4	4.08	7
					3	3.06	
6					2	2.04	6
					1	1.02	

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